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HUMAN CAPITAL IN MODERN ECONOMY – IMPORTANCE, METHODS OF MEASUREMENT AND INVESTMENTS

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K e y w o r d s: human capital, methods of measurement, outlays on education.

A b s t r a c t

The paper aims at presenting human capital in the economy, drawing attention to the multitude of determinants of that factor and the investments in human capital. To achieve the intended objectives the statistics and studies by international organizations, data from the statistical yearbooks of the CSO, scientific publications and websites were used. Significant differences between countries in the funds allocated to financing the activities involved in human capital improvement are observed. In most cases investments in education and in research and development is mentioned. Poland spends USD 5.500 per year per 1 student, which ranks it in the last position among 24 OECD countries covered by the study. Availability of studies in Poland is the highest, although usefulness of studies for finding a job is the lowest. The expenditures on R&D activities represent ca. 0.56% of the GDP and they are among the lowest in the EU countries.

KAPITAŁ LUDZKI WE WSPÓŁCZESNEJ GOSPODARCE – ZNACZENIE, METODY POMIARU I INWESTYCJE

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S ł o w a k l u c z o w e: kapitał ludzki, metody pomiaru, nakłady na edukację.

A b s t r a k t

Celem artykułu jest przedstawienie kapitału ludzkiego w gospodarce, zwrócenie uwagi na mnogość wyznaczników tego czynnika oraz na inwestycje w kapitał ludzki. Do realizacji zamierzonych celów wykorzystano statystyki i opracowania organizacji międzynarodowych, dane z roczników statystycznych GUS, publikacje naukowe oraz korzystano ze stron internetowych. Obserwuje się istotne różnice między krajami w zakresie środków przeznaczanych na finansowanie działań związanych z poprawą jakości kapitału ludzkiego. Najczęściej mówi się tu o inwestycjach w edukację i w sferę badawczo-rozwojową. Polska w przeliczeniu na 1 studenta wydaje 5,5 tys. USD rocznie, co plasuje ją na ostatnim miejscu wśród 24 badanych krajów OECD. Dostępność studiów w Polsce jest największa, natomiast przydatność ich do znalezienia pracy – najmniejsza. Wydatki na B+R stanowią ok. 0,56% PKB, są jednymi z najniższych w krajach UE.

Introduction

The economy of the 21st century is defined as the knowledge based economy (KBE). Globalization of the economy and the involved liberalization of economic relations influence increase in competitiveness. Currently, the material production factors play a less important role in competition among countries. Skills, qualifications and experience of the people influence the possibilities of gaining competitive advantage by a country and prevent its marginalization. Educated society is becoming the "capital" possessing a specific knowledge allowing development of new technologies, products and services.

According to Krzysztof RYBIŃSKI (2006), during the 21st century "the economic power of the country will be built by the power of the minds and not the power of hands and machines". The educated human being becomes the "capital" necessary for achievement of economic goals.

Defining of the human capital

Human capital is defined in different ways, which is a consequence of its multifunctionality within the frameworks of social sciences. One of the simplest definitions says that human capital consists of the people and their skills.

The term "human capital" is defined as the "synthetic characteristic of the working people" (WELFE 2000). The definition of "capital of the knowledge of the society" is the synonym of the notion of human capital (ZIENKOWSKI 2003), according to which human capital is narrowed to the capital of education that is the achieved level of education.

It is said that human capital is the "resource of knowledge, skills, health and vital energy contained in the society" (DOMAŃSKI 1993). Human capital encompasses all individual characteristics of a man that influence the effectiveness of his work: education, abilities, intelligence, health status, age and nature.

According to LUCAS (1988), human capital should be understood as the level of skills influencing productivity. The employee with capital can be substituted by two employees possessing the capital $^1/_2$ h as they are the "productive equivalent" for him.

Defining human capital we can say that it is the personified knowledge. Knowledge is just the information, which is a non-competitive product from possessing which no one can be excluded. Human capital, on the other hand is defined as a competitive and exclusive product (MAZUREK 2007). As opposed to the financial and material capital that can be allocated partially to different solutions, human capital at a given moment can be utilized for one application

only. Another characteristic of human capital is that it is not subject to market trading (it is impossible to change its owner) (PRZYBYSZEWSKI 2007). Human capital is not inherent, it is obtained through investing in the person.

Methods of human capital measurement

The necessity of valuation and assessment of the influence of the intangible factor on the development of economic processes causes that measuring the human capital becomes inevitable. There is, however, no universal measure of that resource. Different methods of defining the measure of human capital hinder investigating its influence on the economy.

The measurement of human capital, in the same way as capital in general, can be performed by applying the cost and/or income method. The third method given by (LE et al. 2003, ZIENKOWSKI 2003, WELFE 2007) is the method using the human resources and considering the level of education.

The cost method considers that the resource of the human capital is the discounted stream of outlays incurred in accumulating it decreased by the depreciation rate of that resource, which can be represented as follows:

$$hc_T = \sum_{t=0}^{T} C_t \, (1 + i - d)^{T-t}$$

where:

hc_T – human capital per the working person,
C_t – costs of investment in human capital considering alternative costs, e.g. loss of wages during the period of education,
i – discount rate,
d – depreciation rate.

In case of the cost method, it is difficult to determine the investment in human capital and the related costs. In practical terms the complete methodology represented by the above formula has not found a wider application. Its simplified form is applied for, e.g. analysis of the outlays on education and health or share of those costs in the GDP (*Gospodarka oparta na wiedzy* 2007).

In case of the income method the starting point is the assumption that the ultimate productivity of the groups of employees determines their wages. Employee wage is considered the measure of human capital. An example here could be the macroeconomic Mincer's equation (1970), in which the wages of

employees (W_i) depend on their acquired education and professional experience. The design of the aggregated measure of human capital is represented by the equation:

$$\mathrm{In}W_i = \alpha_0 + \alpha_1 S_i + \alpha_2 X_i + \alpha_3 X_i^2 + \varepsilon_t$$

where:
W_i – wage of employee i,
S_i – level of education of employee i (measured by the number of years of education),
X_i – professional experience of employee i (measured as the number of years of work).

Another measure based on the Mincer's equation is the quotient of average wages in the economy (WAV) as compared to the wage obtained by an employee possessing no education (WNO):

$$hw = \frac{\mathrm{WAN}}{\mathrm{WNO}}$$

The obstacles to practical application of that method include, e.g. adjustments of the minimum wages or, in educated societies, overstating of wages of unskilled labor, which distorts the measurement of human capital.

Similar to the above presented is the following measure based on the macroeconomic data:

$$\mathrm{HKLZ} = \sum_{i=\min}^{\max} (W_i / W_{\min}) L_i$$

where:
W_i – average wage of employees with i-level of education,
$W_{\min}$ – average wage of employees with the lowest level of education,
L_i – number of employees possessing i-level of education (FLORCZAK 2006).

The presented methods of human capital measurement are applied in few studies on comparison of quality of that resource between countries. This results from the difficulties in obtaining the credible data.

Intellectual capital is treated as equivalent to protection of intellectual rights. Studies on that type of capital concern patents, e.g. the total number of patents or the number of patents per one employee (PRZYBYSZEWSKI 2007).

As presented by the subject literature, in macroeconomic terms the "capital of knowledge" is the basic notion for the analysis of human capital. The capital of knowledge consists of the aggregated scientific knowledge, that is the results of scientific research (R&D) and the knowledge level of the society. The knowledge of the society is expressed by the achieved level of education and it is referred to as the "capital of education".

Determination of the level of knowledge is a problem. The formal knowledge should be differentiated from the actual knowledge. The formal knowledge can be assessed on the base of the outlays allocated to achievement of a specified level of education. The actual knowledge is the actual skills of the employees achieved thanks to the completed education, it is linked to the phenomenon of functional illiteracy that is the situation when an educated person has difficulties with using the acquired knowledge in daily life, in correct writing or reading with understanding (ZIENKOWSKI 2003).

Health also belongs to the measures of human capital. A healthy man, physically and mentally fit, lives longer and a healthy child lives and achieves the age of its professional activity.

In empirical analyses the indicators of scholarization are used:

$$\mathrm{WSK}_i = \frac{S_i}{L_i}$$

where:

S_i – number of people in the process of education at i-level of education (elementary, secondary, tertiary)

L_i – total number of people in the age group corresponding to the statutory period of attending education at i-level of education.

The mobility of human resources has a significant influence on the level of human capital. During the recent period emigration both within and outside the country has been observed. Migrating individuals usually possess a high level of education both formal and informal.

Statistical approach to investments in human capital – education and R&D outlays in the world, in Europe and in Poland

Outlays on R&D

The outlays on research and development (R&D) are the most frequently given measure of investments in human capital. The majority of definitions interpret research and development activities as systematically conducted works aiming at increasing the resource of knowledge on the man, society and culture, which is to serve finding new possibilities for utilizing the knowledge. The bases for that definition of the R&D zone are provided by the OECD *Frascati Manual*, the publication that allows international comparisons (Portal Europa).

Within the frameworks of R&D activities three types of research are identified:

– Basic research – theoretical works within a specific scientific discipline that are not focused on achievement of specific practical goals.

– Applied research – research works undertaken to obtain new knowledge and to apply it in practice.

– Development works, which serve application of already existing knowledge to development of new or improvement of the existing products, processes or services.

The GERD (*Gross Domestic Expenditure on Research and Development*) expressed as the percentage of the GDP is the measure applied for comparisons and assessment.

The goal indicated by the European Union is to achieve 3 percent share of outlays on R&D in the GDP. Achievement of that goal, according to the EU recommendation should be financed $^2/_3$ from the private funds and only $^1/_3$ from the national budgets of the Member States.

Many authors (JONES, WILLIAMS 1999, STONEMAN 2003, LACH 2000, MŁODAWSKA 2001) mention the necessity of the active role of the state in the R&D domain, which is justified by unreliability of the market mechanism in allocation of funds to that use. Investment decisions of private entities are focused on profit and dependent on the related risk level. However, the social benefits of investments, which, although ineffective for an individual entity, might be socially useful should be remembered. The activity of the state in the area of basic research seems to raise the least doubts, among others, because it is believed that applied research and development works, which could generate profits for entrepreneurs would, sooner or later, be carried out. During the recent years an increase in public outlays on R&D activities has been observed

in the European Union countries while at the same time the outlays of enterprises for that purpose have not increased, which spreads the gap between the European and the American economy. In case of many countries support of private funds with public funds (the so-called *crowding out*) has been observed, which is a serious argument against financing of research and development activities by public institutions. There are works that enterprises would undertake without state subsidies and it happens that the state with its research gets ahead of the activities by private enterprises (CZERNIAK 2006).

The differences in the levels of outlays on R&D activities depend on the structure of the economy. Significant outlays are recorded in the countries with a high share of the processing industry, mainly high technology and countries in which large companies position their activities (the R&D outlays by large companies are generally much higher than those of small and medium enterprises). The other factors determining the levels of investments are, e.g. political, systemic and cultural factors. High levels of investments made by countries at a lower level of development are determined by extra-economic reasons. This is the situation in case of Belarus, Cuba and Pakistan. Post-communist countries as e.g. Poland, Slovenia and Rumania implement the principles of R&D funding that existed during the previous system (OKOŃ-HORODYŃSKA 2004).

The European Union is not nearing the assumed target of 3% outlays on R&D but in spite of that the level of those outlays there was three times higher there than in Poland. The outlays on R&D in 27 EU countries averaged 1.84% of the GDP (2006) and that level did not change as compared with 2005 and decreased as compared with 2000 when it was 1.86% of the GDP. In Poland the level of outlays on R&D in 2006 was 0.56% of the GDP[1].

Globally, the United States have the highest share in the R&D outlays (35%) followed by the 27 countries of the EU (24%) with Japan (14%) at the third place (OECD Science... 2008). Among the European Union countries the highest GERD/GDP ratios, exceeding the targets of Lisbon Strategy, were recorded in Sweden (3.82) and Finland (3.45). Those countries are followed by Germany (2.51), Austria (2.45) and Denmark (2.43). The countries with the lowest R&D outlays are Cyprus, Rumania, Bulgaria and Slovakia. Among the countries that joined the EU together with Poland that ratio is the highest in the Czech Republic (1.54) and Slovenia (1.59).

In Poland a decreasing trend is observed as concerns the R&D outlays. In 1994 that ratio was 0.82 and it decreased to 0.56 in 2006. This is the lowest value of that ratio since the beginning of the transformation period. That unfavorable situation may influence increasing the development gap between

[1] Own work based on the Eurostat data presented.

Poland and the European countries (HELLER, BOGDAŃSKI 2005). The national outlays on research and development activities are in many cases lower than the outlays for that purpose allocated by multinational companies.

It is worth looking at the sources of funds for research and development and the ways of spending them. The state budget carries the main burden of financing scientific research, which is contrary to the proposal of the Lisbon Strategy. In 2006, the business entities incurred $^1/_4$ of the outlays on research and development. In 2007, the percentage share of the state budget increased by 1 percent point while the share of enterprises in financing research and development activities decreased by 0.6 percent point. Two countries, the USA and Japan represent the reference point for the EU Member States. Also South Korea achieves a high level of outlays on research and development and a satisfying structure of funding such activities.

In 2004, the share of outlays on R&D was 2.67% of the GDP and the private sector financed 64% of all the outlays in that field (1.70% of the GDP. In Japan that ratio was 3.17% and in South Korea 2.99% and in both those countries the private sector covered 75% of the total outlays. Against that background the results of the European Union were not very optimistic. In 2005, in the outlays representing 1.84% of the GDP the share of the private sector was 1.0% of the GDP and the public sector 0.64% of the GDP.

The division of funds between the basic research, applied research and development works influences the effectiveness of utilization of funds allocated to R&D. According to the traditional approach the basic research should be characterized by relative regularity while development works and applied research are of major importance for increasing the level of innovation and competitiveness in the short-term. It is said that the following proportions should be maintained for that purpose: one unit of outlays for basic research should be matched with two units of outlays for applied research and three units for development works. It should not be forgotten that basic research can unexpectedly translate into practical effects and their role for the development of science as discipline as well as performance of the educational, informative and culture-creating functions should also be remembered (TOMTAS-ANDERS 2007).

Countries of Central Europe, including Poland, focus their activities on basic research, which is a result of the systemic transformation as well as lack of experience in trade in advanced technologies, lack of motivation for obtaining patents for the achievements and preferences in the field of academic activities. In case of Poland, funds allocated for basic research exceed such funds allocated by Western countries (KLINCEWICZ 2005). Among the three types of research the development works are important from the perspective of enterprises. Closeness to market, i.e. the share of funds allocated for development works allows determining how science supports production.

Considering the structure of outlays in Poland, it can be noticed that a significant proportion of funds is allocated to studies that have no application in the economy. As of 2000, a decrease in the share of basic research in total outlays has been observed. In 2006, it was observed that the outlays for development works were the largest at 38.8%. During the last year for which the data is available again the unfavorable change in the form of an increase in the share of current outlays allocated to basic research and a decrease in the share of funds allocated to the development works to 38.3% was observed.

In addition to the data showing the scope and structure of outlays on research and development the qualitative assessment of the expenditures incurred deserves attention. The achievements of scientific institutions according to the studies of 2002, cover mainly publications as well as obtaining scientific degrees and titles. In case of tertiary schools and the Polish Academy of Sciences this is almost 90% of their activities. And which is the most important, only 20% of total scientific achievements of all the assessed scientific units was useful in economic practice (OKOŃ-HORODYŃSKA 2004).

In subject literature opinions can be found that the sector of research and development is lagging behind and has not been subjected to decisive transformation. The R&D sector is characterized, among others, by concentration outside enterprises, organizational structure different from that dominating in the developed countries and dependence on the economic standing of the public sector (JASIŃSKI 2006). The majority of outlays are incurred by public institutions and there is too much focus on the basic research.

Poland, using the experience of other European countries, among which the economic changes in Finland should be noticed, as guidelines, should transform the implemented scientific and research policy. An important argument for strengthening the R&D sector in Europe is the increase of employment and improvement of human capital effectiveness. It is necessary to take actions concerning, among others, increasing the interest of young people in scientific career and assuring the potential for development of such careers as well as increasing the mobility of the scientific personnel (BUDZYŃSKA 2005).

Outlays on education

Education determines the social status, decides participation in the labor market and taking an appropriate position there. In the majority of developed and developing countries education is an important investment in the society. In all the OECD countries the percentages of people that participate in the process of education increase. As a consequence the share of outlays on

education in the budget plays an important role. Public outlays on all the levels of education average 13.2% of their total expenditures for all the OECD countries, which represents 5.4% of the GDP. The available data on outlays on education incurred in 2005 by selected European Union countries are presented in Figure 1.

Public expenditures on all the levels of education in the EU countries average 5.3% of the GDP. The average level of outlays on tertiary education at 1.3% is similar to the outlays allocated to tertiary education in Poland (1.2%).

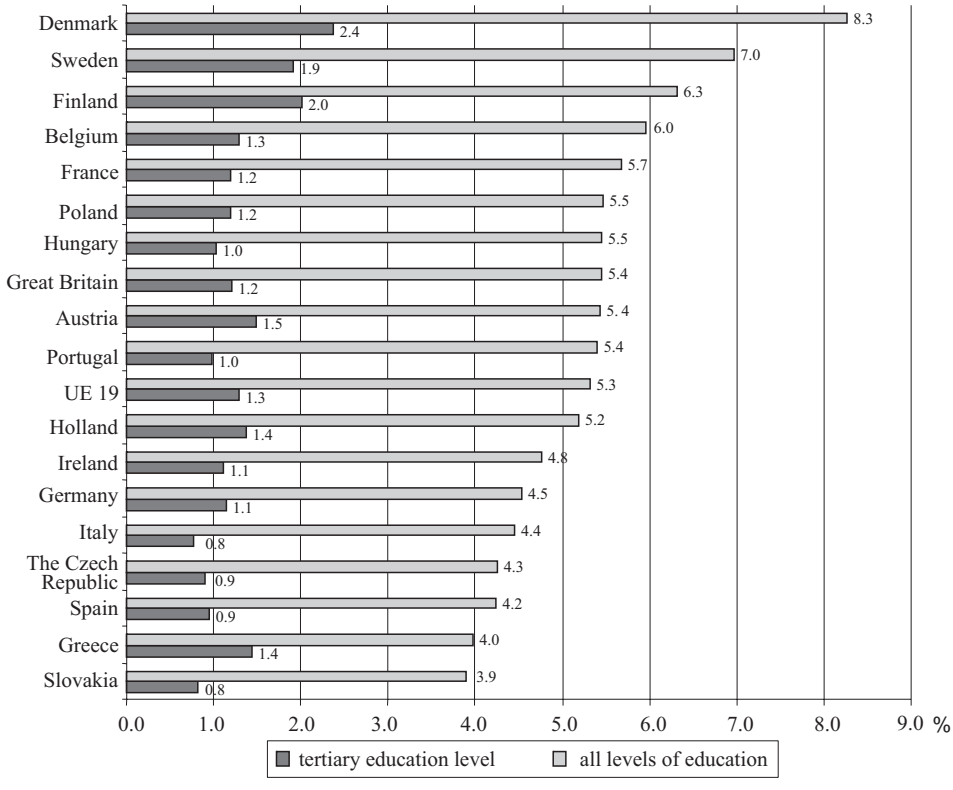

Fig. 1. Public outlays on education as % of the GDP in selected EU countries in 2005
Source: own work based on the OECD data in Education at a Glance (2008).

In the OECD countries the state carries the main burden of financing the educational institutions. In 2005, public sources covered 85.0% of those outlays. The largest public funds in relation to the GDP are spent on education in Denmark, Sweden and Finland. The funds allocated to all levels of education there represent 8.3%, 7.0% and 6.3% of their GDP respectively. Additionally,

those are the countries where the highest share of public funds in total outlays on education is recorded at 92.3%, 97.0% and 97.8% of the total outlays respectively, which means that financing of education from private funds plays a marginal role in those countries.

Significant private funds are allocated to education in countries such as the United States (32.7%), Korea (41%), Australia and Japan (25% each). Among the EU countries, the highest share of private funds in total outlays on education was recorded in the United Kingdom (20%), Germany (18%), Slovakia (16%) and Spain (11.4%) (OECD Education. 2008).

The index of investments per one student/pupil is an important measure of the investments in education. The estimated outlays for one student of tertiary studies and a secondary school student expressed in US dollars are presented in Figure 2.

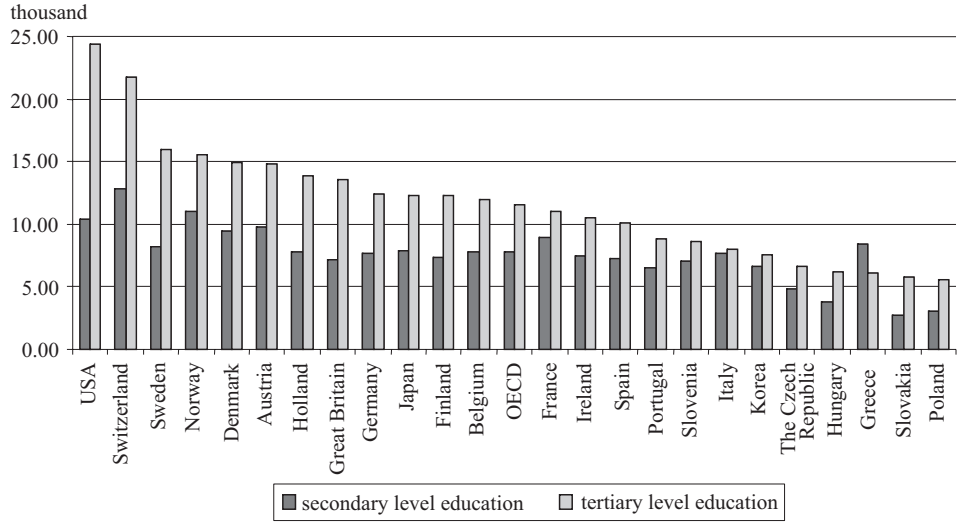

Fig. 2. Year outlays per one student/pupil in USD according to the PPP in 2005
Source: own work based on the OECD data in Education at a Glance (2008).

During the last 10 years the outlays on education in the OECD countries increased by over 20%. The largest outlays on education are recorded in the United States where the outlays per student amount USD 24,000. The US is followed by Switzerland at USD 21,000. Finland allocates USD 12,000 for education of one student and it educates an increasing number of engineers recognized worldwide. Poland looks the weakest as concerns outlays per student at USD 5,500 per year. This amount is five times lower than in the USA and two times lower than in Germany.

Underinvestment as compared to other countries is also observed in case of secondary schools where the outlays per 1 student amount USD 3,000, i.e. more than two times less than the OECD average.

The smallest differences between Poland and the OECD countries are found in case of outlays at kindergarten level. Year outlays on 1 kindergarten pupil in Poland represent 84% of the average for the OECD countries.

The key problems for Poland are, first, underinvestment in education and second oversize administration to which significant volumes of funds are allocated and, as a consequence, an increasing focus not on the market needs of sciences but on less capital intensive humanities. Doctor Jerzy Lackowski from the College of Pedagogies of the Jagiellonian University computed that every fourth zloty from the educational payroll is allocated not to the wages of teachers but to the funding of the work of clerks (KULA, ROŻEK 2008).

Summary and conclusions

Human capital is considered a modern production factor in post-industrial economy that is subject to extensive processes of globalization it has become the inevitable factor of development. Rational development and utilization of it play the key role in preventing the divergence of economies.

On the base of the analysis of available materials the nature of human capital and methods for measurement of that factor were presented. The basic determinants of the human capital, i.e. education and investments in knowledge as well as outlays on the R&D activities were presented. On the base of the aggregated research material the following conclusions can be formulated:

1. Human capital as the fourth production factor next to the land, labor and capital is strongly correlated with the economic growth. It is becoming the engine of development, increase of production and production effectiveness in both macro scale and in the scale of the individual organization.

2. There is need to measure human capital in both the organization and in macro scale to be able to assess the influence of that factor on the economy.

3. It is considered that the research-development activities conducted by scientific institutions are of little use in practical economic activities. It is worth pointing out that the funds should be allocated to activities of practical application. It is necessary to increase the funds allocated to development works that are the most important from the market perspective.

4. Polish state allocates 1.2% of the GDP on education at the tertiary level and 5.5% of the GDP on all levels of education. Year outlays per 1 student amount ca. USD 5500 which is five times less than in the USA and two times less than in Germany. The outlays per one secondary student amount USD

3,000, which is two times less than the average for the OECD countries. This shows the scale of underinvestment in the sector, which can be considered one of the causes for the insufficient quality of the Polish system of education.

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INVESTMENTS AS A REGIONAL POLICY INSTRUMENT

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K e y w o r d s: Regional policy, private and public investments, province attractiveness.

A b s t r a c t

The aim of the study was to evaluate disparities between provinces in investment acquisition. The evaluation was based on an analysis of investment outlay inflow to provinces with varied economic development level in the years 2002–2006. According to the hypothesis adopted in the study, provinces at a higher level of economic development are more attractive to investors. The analysis shows that the level of a province economic development affected the amount of total investment acquired. Therefore, the study hypothesis has been corroborated. Public, as well as private, investment was largely localised based on the attractiveness criteria which were in turn founded on the province's economic development level. According to the evaluation, distribution of investments reduced the existing disparities between groups of provinces with different levels of economic development. Private investment, in turn, with liberal criteria of allocation do not deepen the existing inter-regional disparities, but they alleviate them to a similar degree as public investments. Only in the group of investments with the lowest level of economic development (the provinces of Lublin, Podkarpacie, Podlasie, Świetokrzyskie and Warmia and Mazury) was the private investment growth rate lower.

INWESTYCJE JAKO INSTRUMENT POLITYKI REGIONALNEJ

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S ł o w a k l u c z o w e: polityka regionalna, inwestycje prywatne i publiczne, atrakcyjność województw.

A b s t r a k t

Celem badań była ocena międzywojewódzkich dysproporcji w pozyskiwaniu inwestycji. Podstawą tej oceny była analiza skali napływu nakładów inwestycyjnych do województw o zróżnicowanym poziomie rozwoju gospodarczego w latach 2002-2006. W badaniach przyjęto hipotezę, że województwa

o wyższym poziomie rozwoju gospodarczego są bardziej atrakcyjne dla inwestorów. Z przeprowadzonej analizy wynika, że poziom rozwoju gospodarczego województw miał wpływ na skalę pozyskiwanych inwestycji ogółem. W ten sposób pozytywnie zweryfikowano hipotezę badawczą. Inwestycje publiczne – podobnie jak prywatne – były w znacznym stopniu lokalizowane na podstawie kryteriów atrakcyjności inwestycyjnej, które są efektem poziomu rozwoju gospodarczego województw. Ocena wykazała, że podział inwestycji publicznych zmniejsza istniejące dysproporcje między grupami województw o różnym poziomie rozwoju gospodarczego. Inwestycje prywatne przy liberalnych kryteriach alokacji również nie pogłębiają istniejących dysproporcji międzyregionalnych, lecz łagodzą je w stopniu zbliżonym do inwestycji publicznych. Jedynie grupa województw najsłabiej rozwiniętych gospodarczo (lubelskie, podkarpackie, podlaskie, świętokrzyskie i warmińsko-mazurskie) charakteryzowała się wolniejszym tempem wzrostu nakładów inwestycyjnych sektora prywatnego.

Introduction and the aim of the study

The practical effects of the application of the principle of subsidiarity in regional policy are especially visible in investment acquisition and location. Investors are increasingly often approaching regional or local authorities with applications for an investment location in a specific town or province. Only the most significant privatisation decisions and some global-level initiatives are consulted on with the central government. In such cases, some objective differences (resulting from economic factors) between provinces in investment acquisition become apparent. If economic factors are the most important criterion affecting an investment decision, its location is an important part of the considerations. Therefore, it can be assumed that there are great differences between the provinces in terms of their investment attractiveness. The differences manifest themselves in decisions of investors who prefer some regions to others. If such processes last several years, there is no doubt that they will create disparities in economic development between regions. Therefore, the aim of the study was to evaluate such disparities between provinces in investment acquisition. The evaluation was based on an analysis of the amount of investment outlays made in provinces with diverse levels of economic development in the years 2002–2006. A hypothesis was adopted that better-developed provinces are more attractive to investors. Consequently, a majority of investments are located there and the lower the economic development level is, the lower the investment outlays are. This pattern mainly applies to private investments, but it cannot be ruled out with respect to the public sector as well.

Object, scope and method applied in the study

The study dealt with investment outlays, i.e. outlays in cash or in kind, whose aim was to create fixed assets or to improve existing property, as well as outlays made with a view to starting an investment project. The study material

was obtained from the Regional Data Bank (GUS 2008). The statistical data collected there are presented as total investment outlays and their purpose, i.e. investment in the private sector. Therefore, total investment outlays include private investments and public (central and local) ones. The study was based on the values expressed at current prices per 1 provincial inhabitant in consecutive years between 2002 and 2006. The material obtained in this way was as comparable as possible. Current prices were used due to the relatively low inflation rate during the period in question. The consumer price growth index was equal to 0.8% in 2003 and 3.5%; 2.1% and 1.0% in subsequent years, respectively (Wskaźniki 2008). The inflation rate was low enough for the analysis to be free of a significant error resulting from the application of current prices.

The study covered the last two years of the pre-accession period (2002–2003) and all the investment funds within the National Development Plan, which was valid for the first three years of Polish membership in the EU (2004–2006). Comparable data for three subsequent years (2007–2009), i.e. from the period of the National Coherence Strategy for 2007–2013, which is still being implemented, will be available at the end of this year. Only then will it be possible to make a similar evaluation which will take into account subsequent years of Polish membership in the EU and the period of economic slowdown in Poland and the crisis in Europe.

During the period covered by the study, Poland was in an increasing trend in the trade cycle. Although the GDP growth rate in the first year of the study (2002) was equal to a mere 1.4%, it was noticeably higher in subsequent years (3.9% in 2003; 5.3% in 2004 and 3.6% and 6,2% in 2005 and 2006). Despite a high and diverse GDP growth rate in Poland, it was assumed that the relationship of the economic development level in the provinces did not change significantly during the period under study. The assumption was verified based on the statistical data presented by GUS (*Produkt Krajowy Brutto*... 2007).

It was assumed that the levels of the provinces; economic development are sufficiently varied and the entire set can be divided into three groups. The first one comprised 5 provinces (of Lower Silesia, Mazovia, Pomerania, Silesia and Great Poland). Those were the ones in which the GDP per capita value exceeded 95% of the national level. The second group comprised 6 provinces (Kuyavia and Pomerania, Lubuskie, Łódź, Little Poland, Opole and West Pomerania), in which GDP per capita ranged from 80% to 95% of the national level. The third group comprised 5 provinces (of Lublin, Podkarpacie, Podlasie, Świętokrzyskie, Warmia and Mazury) with a GDP of less than 80% of the national level.

Investment in regional development

Including investment in the process of regional policy implementation is one of difficult practical issues. It is affected by many restricting external factors and has significant internal determinants, i.e. domestic causes. Polish membership in the EU may have increased the significance of regional policy, but at the same time it must be noted that according to the valid criteria, all the Polish provinces are classed as retarded in development. Hence, all of them are entitled to apply for European funds. This blurs great internal disparities, i.e. great differences in the level of economic development between the provinces. Another very important external factor is connected with the variability of the foreign exchange rate. It was assumed at the investment planning stage that the EUR/PLN exchange rate is equal to 4. Similar criteria were adopted with respect to investments in the period between 2007–2013. Only in the years 2008–2009 was the recorded exchange rate variability greater than ± 15%. In consequence, the real amount of funds from the EU varies, irrespective the internal factors. That being the case, the scope of investment changes or the share of domestic funds from the state budget (or local budgets) increases.

The basic internal factors are largely associated with the shortness of the period that free market economic principles have been in place and an even shorter period which has passed since the decision was taken to join the EU. When using investments as one of the more important instruments, regional policy is not a fully autonomous activity, but it is rather a function of economic policy, including financial policy. The level of investment in market economy is largely dependent on the economic growth rate, interest rates and the overall climate for investments. Of these three elements, only the latter (and this only partially) depends on the policy of regional and local authorities, whereas financial policy does not take into account regional issues and only determines the investors; involvement around the country. Following the accession, Poland has implemented economic policy while taking into account regulations which are in force in the EU.

During the period which preceded Polish accession to the European Union, decisions were taken whose effects will last for many years, although the legal system of the European Communities does not allow for such solutions. In my opinion, creating special economic zones was such a harmful decision. In nearly every province (the first error), enclaves of privileged areas (the second error) were created. In effect, for no sound reasons areas were allocated on which investors were granted tax breaks and privileges, which encourage them to make investments. As a result of the existence of special economic zones, (covering the area of 5965 ha in 2000, which accounts for 0.015% of the country) the competitiveness of Polish companies around the zones was

decreased as compared to large foreign companies which operate in the zones. Another adverse effect is the migration of capital from other parts of the country as its use in the zones provided an opportunity for tax exemptions (WALDZIŃSKI 2005, p. 174). Hence, it can be concluded that if an economic and financial system in a country does not favour investments, it should be changed to make it friendly instead of creating special zones where general rules do not apply. Special economic zones have affected investment decisions, but it should be supposed that their role will diminish. Currently, investment location decisions are increasingly influenced by Polish membership in the European Union.

After making the decision to join the EU, two distinct trends started to develop in Poland in making and implementing regional investments. In one of them, public investments (mainly infrastructural ones) are financed by EU funds and by resources of local governments. At least until 2015, such actions will be more and more visible and important. However, studies conducted so far have suggested that distribution of the funds among provinces is highly specific. It was found that the regional distribution of funds from the European Union in 2000–2005 was a consequence of the method which gave bonuses to provinces with larger populations. However, studies have not confirmed the relationship between GDP per capita in a province and the amount of EU aid per province inhabitant. The absence of any correlation (positive or negative) indicates that the adopted criteria do not distinguish provinces in terms of expected economic outcome. However, they adopt an egalitarian approach, i.e. an equal amount per each citizen of the country (HELLER, SZCZEPANIAK 2008).

Since Poland's accession to the EU there have been two groups of projects carried out which are subsidised from the Community budget. These are investment projects carried out by public and private sectors. Private projects include all foreign investments as well as those financed from domestic resources. Private investments in Poland accounted for over 67% of the total outlays during the period between 2002 and 2006 (BDR, GUS 2008). The motives that lie behind private investments can be reduced to the general market principles. Satisfying the demand for goods is, in fact, aimed at accelerating the economic growth of the country. Exactly the same objectives are formulated by all the provinces of the country. Provinces compete for investments. Regional authorities take actions which encourage potential investors to locate their projects in specific provinces. The expectations of investors towards provinces are the same as towards the entire country. They hope to locate their investment where their goals are the most easily achieved. In consequence, the investments in a country of the size and diversity of Poland are distributed unevenly. This especially concerns private investments. Assuming there is a comparable social and legal climate among the potential

recipient regions, economic factors become the major criterion of selecting the location. This second trend – represented mainly by the private sector – uses market criteria to select the place where an investment will be located. Therefore, it is obvious that there is a process of liberalisation going on. It is assumed in the study that the level of economic development of a province is an important outcome of such decisions.

Investment location decisions in a market economy are taken by the capital owner based on economic calculations. This raises competition between local governments for favourable decisions of investors. However, regional and local authorities act within a similar institutional and legal framework. Hence, initiatives which encourage investors to locate investments in their area are similar and limited in character, although there are some interesting proposals of an individual character. However, the economic potential of a commune or a province, which allows the authorities to make their offer for potential investors more attractive, is a decisive factor. But it must be borne in mind that the specific location of an investment is sometimes resisted for fear of increasing competition. Between a favourable climate and hindering initiatives by actions which are not illegal there is vast space for official and unofficial initiatives of authorities.

Apart from immediate activity of local authorities in acquiring investments, an important role is played by local conditions. In contemporary literature, such factors are collectively referred to as the investment-related attractiveness of provinces. There is a long tradition of studies of the subject. Their most typical contemporary representation may be divided into three groups. A characteristic example of the first group are studies conducted by the Gdańsk Institute for Market Economics, in which the authors select features and determine their weights; these are later used to estimate the investment attractiveness, which "is understood to denote the ability to persuade to make an investment by offering a combination of location benefits which can be achieved in the course of ordinary business activities. They stem from the specific features of the area in which business activities are conducted. The benefits are referred to as location-related factors. Therefore, the attractiveness of an area is determined by a set of location-related factors. The areas which offer the optimum combination of location-related factors are attractive for investors because they make it possible to reduce investment outlays and operating expenses in the company, facilitating profit maximisation and lowering the investment-related risk" (KALINOWSKI 2007, p. 9). As the study progresses and in consecutive reports, the authors adjust their selection of features and determination of their weights. However, this intensifies the impression that subjective feelings play an important role. A characteristic example may be the factor referred to as the *level of economic development,*

which – unlike subregions – is not taken into account in evaluation of province attractiveness. However, studies suggest that a certain level of economic development is a decisive factor in acquiring direct foreign investments (HELLER, WARŻAŁA 2005). It is the same with another factor: *degree of protection and the condition of the natural environment.* Despite those critical remarks, the studies are dominated by features which investors undoubtedly take into account, e.g. transport availability, labour cost as well as the size and quality of resources, absorbability of the market, development of socio-economic infrastructure as well as the level of common security and the region's activity towards investors (KALINOWSKI 2007, s. 11).

Another group of studies may be referred to as ones derived from multidimensional comparative analysis. It is a large group of authors (JAJUGA 1993, MALINA 2004, ZELIAŚ 2000 and others). The most recent results on the subject were published by B. Guzik in early 2008. The value taken as the basis for determining investment attractiveness is the actual investment outlay made by private investors. However, this is not a classic comparison of the investment outlay per province inhabitant, but an examination of the attractiveness-related rent, i.e. surplus or deficit of investment outlay per capita to the "norm" determined with the level of a provincial development based on the national model of relationship between investment outlays and the level of development (GUZIK 2008, p. 61, 62). It is not – unlike in the studies conducted by the Institute of Market Economics – only a subjective evaluation of the provinces' investment potential, but a successful attempt at using the actual outlays. Those are only outlays made by the private sector, which is justified from the point of view of market behaviour and reactions, but restricting the studies only to the investment in this group, in fact, prevents one from making a synthetic evaluation. Public sector investments in Poland account for a third of the total outlays, therefore their role is not neutral in terms of the future development of the country and the provinces. On the other hand, a study by B. Guzik contains an interesting evaluation of investment attractiveness (attractiveness-related rent) of provinces for individual sections. Apart from the total attractiveness, province attractiveness can be evaluated in as many as 11 sections, e.g. agriculture, total industry, etc. Based on a specific structure of attractiveness, the author points to the very important role of weights. In his opinion, they do not have to have positive qualities. It is obviously an interesting remark, especially if the actual results are compared with a model, which always expresses a certain average, with possible deviations either *in plus* or *in minus*.

A third group of studies is the most synthetic in character. Their aim is to evaluate the effect that the overall level of provincial economic development on the ability to acquire and spend funds from various sources (foreign invest-

ment, revenues of local governments, Community funds, public and private investments, etc.). Such funds obviously affect the economic development of provinces, although their sources and character vary. They are – it is assumed – linked by a connection with the level of economic development of a province and, in consequence and in the long run, the process of deepening the existing developmental disparities. An example is provided in a study by A. Wasilewski, who claims that the economic development of local governments is clearly dominated by those with the highest income, which not only manifests itself in the number of business entities, but also foreign investments in such areas are located much more frequently (WASILEWSKI 2005, p. 113). The presented study represents a similar trend. Its aim is not to make assessments of individual provinces, but to seek general (synthetic) regularities which characterise groups of provinces which are similar in terms of their economic development.

The effect of the level of economic development on the amount of the investments acquired

The level of economic development of provinces, expressed as GDP per capita, may affect the amount of investment outlays, investment growth rate in the years covered by the study and the share of the public sector. The factors under evaluation include total investments and private investments per province inhabitant, and the results are presented in Tables 1 and 2.

Table 1

Total investment outlays in the provinces with diverse GDP level*
(PLN per inhabitant)

Groups of provinces by GDP/inhabitant*	2002	2003	2004	2005	2006	2002–2006 Average, PLN
I group, 5 prov., GDP over 95% of the national average	3460	3455	3760	4013	4784	3894
II group, 6 prov., GDP 80-95% of the national average	2294	2385	2620	2978	3497	2755
III group, 5 prov., GDP below 80% of the national average	1887	1970	2201	2442	2774	2255
National average	2858	2902	3155	3434	4062	3282

Source: Regional Data Bank, GUS. Warszawa WWW.stat.gov.pl.
* I group 5 prov. (Lower Silesia, Mazovia, Pomerania, Silesia, Great Poland).
II group 6 prov. (Kuyavia-Pomerania, Lubuskie, Łódź, Little Poland, Opole, West Pomerania),
III group 5 prov. (Lublin, Podkarpacie, Podlasie, Świętokrzyskie, Warmia and Mazury).

Table 2

Investment outlays in provinces with diverse GDP level*
(PLN per inhabitant)

Groups of provinces by GDP/inhabitant*	2002	2003	2004	2005	2006	2002–2006 Average, PLN
I group, 5 prov., GDP over 95% of the national average	2412	2415	2439	2696	3284	2649
II group, 6 prov., GDP 80-95% of the national average	1500	1579	1726	1840	2151	1759
III group, 5 prov., GDP below 80% of the national average	1270	1255	1371	1523	1745	1433
National average	1948	1981	2149	2237	2688	2201

Source: Regional Data Bank, GUS. Warszawa WWW.stat.gov.pl.
* I group 5 prov. (Lower Silesia, Mazovia, Pomerania, Silesia, Great Poland).
II group 6 prov. (Kuyavia-Pomerania, Lubuskie, Łódź, Little Poland, Opole, West Pomerania),
III group 5 prov. (Lublin, Podkarpacie, Podlasie, Świętokrzyskie, Warmia and Mazury).

The average annual level of investments per 1 provincial inhabitant amounted to PLN 3282 in 2002–2006. Only in group I of the provinces (5 provinces with the highest economic development) were the outlays higher by about 19%, whereas in group II (6 provinces with the average economic development) they were lower by about 16% than the average. The amount of investments acquired by the third group of provinces (of Lublin, Podkarpacie, Podlasie, Świętokrzyskie and Waria and Mazury), i.e. those with the lowest level of economic development, was the smallest. The data presented in Table 1 show that during a year it was lower by about 31% than the average level. However, disparities between the groups of provinces under evaluation were greater during the first year of study (2002). In group I, the outlays were higher than the average by about 21%, whereas in group II they were lower by 19% than the average and in group III they were lower by as much as 34%. During the last year (2006), the relationship was as follows: group I – more by 18% than the average, group II – 14% less than the average and III – 32% less than the average.

The change of the relationship between the three groups was caused by varied investment outlay growth rate. Although the investment outlays in 2002–2006 grew by about 42% on average, the growth rate was lower only in group I – 38%. Total investment growth was the largest in group II – by 52%, whereas in group III it increased by ca. 47%, i.e. above the average growth rate (Table 1). The data provided indicate that the largest total investment per capita was acquired by the provinces with the highest level of economic

development. As it decreased, the investment outlays also became lower. However, it turned out in subsequent years that the disparities became smaller, with the process of reduction of the distance between the group of the most developed provinces and those in group II were most easily observable. On the other hand, the growth rate in the poorest provinces (group III) was above the average, but the values were so slight that the distance between them and the other provinces decreased only to an insignificant extent.

The average annual amount of private investments per capita was equal to PLN 2201 in 2002–2006, which accounted for ca. 67% of total investment outlays. The relationship changed only slightly during the period covered by the study. The private investment in 2002 accounted for 68% of the total investment outlays in Poland and for about 66% in 2006 (Table 2). The average private investment outlays during the entire period in the five provinces comprising group I were higher by 20% than the average private investment for the whole country. The relationship of private investment outlays in the other two groups of provinces to the average level for the entire country was also close to that which characterise the total investment level. Private investment in the six provinces included in group II was lower by about 20% than the average outlays level around the country; the difference was about 35% in group III. Further similarities in the relationship between total and private investments were observed in the first year of study. The disparities between the groups in 2002 were also slightly larger. The outlays in group I were larger than the average value by about 24%, whereas in group II they were lower than the average by 23%, and in group III even by 35%. The relationships in the last year of study (2006) were as follows: group I – 22% more than the average, group II – 20% less than the average and group III – 35% less than the average.

The specification in Table 2 shows that such relationships between the groups of provinces were caused by changes in the private investment outlays. The outlays in the sector during the period covered by the study (2002–2006) rose by about 38%, i.e. more slowly than the total outlays by 4 percentage points. The quickest growth of private investment outlays during the same period was recorded in group II – by about 43%, i.e. more slowly by 9 percentage points than the outlays growth rate in the group. Private sector outlays in group I increased by ca. 36%, which makes it slower by only 2 percentage points than the overall outlay growth rate. Private investment in group III rose by ca. 37%, i.e. more slowly by 10 percentage points than the total outlays.

To conclude: private investment outlays per capita – like total outlays – were the greatest in the group of provinces with the highest level of economic development. The disparities between provinces in this respect decreased during the period under study, with the process of decreasing the distance between the group of the most developed provinces and the provinces in group

II the most easily noticeable. The least developed provinces (group III) had the growth rate similar to the average, hence the distance between them and the other groups of provinces did not change significantly.

Summary and conclusions

1. The level of economic development of provinces significantly affected the amount of total investment. This means that the main study hypothesis has been substantiated. The disparities between the groups of provinces were reduced during the period under study. This stems from the fact that the total investment growth rate was lower in the most economically developed provinces than that in the other two groups. The provinces with the average level of economic development (group II) decreased their distance (measured by the difference in percentage points from the average value for Poland) from group I from 40 percentage points in 2002 to 32 points in 2006. The difference between group III and group I was reduced from 55 points in 2002 to 50 points in 2006. However, the difference between group II and group II increased from 15 to 18 points.

2. The private sector investments accounted for 2/3 of the total investment in Poland during the period under study. The share decreased slightly during the period from 68% in 2002 to 66% in 2006. Although this is a small change, it is the most apparent in the groups of provinces examined. A general analysis shows that the relationships between the total and private investment are similar in all the province groups. The provinces with the average level of economic development (group II) reduced their distance (measured by the difference in percent from the average value for Poland) from group I from 47 percentage points in 2002 to 42 points in 2006. The difference between group III and group I decreased from 59 percentage points in 2002 to 57 points in 2006. The difference between group II and III increased from 12 to 15 points.

3. The most general and synthetic assessment can be reduced to a statement that both public and private investments were located largely based on the investment attractiveness criteria, which is determined by the level of provincial economic development. The economic development of a province plays a double role. On the one hand, it is an indicator of the overall culture and climate for business activities and favourable attitude of local and regional communities to investments, i.e. it represents so-called "soft qualities". On the other hand, it also expresses so-called hard qualities, i.e. position in relation to markets, resources and quality of labour force, quality of roads and transport connections as well as the scientific base. Therefore, regardless of many detailed factors, which affect a decision, and the practical location of a specific investment, the study shows that from the perspective of the entire country,

the investment attractiveness of a province can be expressed by the level of its economic activity.

4. The study, which takes into account changes over time, shows that there is a slow process going on in Poland which is decreasing the disparities between provinces. It involves an increase in total investments and – in similar proportions – in investment outlays in the private sector. It does not include all the provinces to a similar extent. Reducing the distance is visible especially between the group of provinces with the average level of economic development and the best-developed provinces. Although the difference between the provinces with the lowest level of economic development and the average value is decreasing, this does not concern private investments; moreover, the difference is increasing if one considers the group with the average level of economic development.

5. Since the first decade of the 21st century, there have been two distinct trends in the process of making and implementing investments. The first one involves mainly public investments which are financed from Community funds or from the local governments; own funds as well as from the central budget. The other group includes private sector investments, with direct foreign investments. Implementation of this group of investments is determined by economic calculations, which means that allocation of private investments in provinces is clearly liberalised. Therefore, regional policy faces two fundamental problems. On the one hand, it is an approach to public investments, which is largely connected with Community funds; therefore, is the demographic criterion of the fund distribution the most appropriate? The other problem is the attitude to liberal principles of inflow of private investments to provinces. Special economic zones are one of the worst solutions for regional development; therefore, this option of controlling investment inflow should be restricted until they are completely eliminated. It may be that it is the most rational and expected solution from the point of view of development of the entire country to leave the decisions in the hands of investors.

6. The study explains part of the doubts. A synthetic assessment has shown that distribution of public investments reduces existing disparities between groups of provinces with different levels of economic development. Private investments, in turn, whose liberal principles of allocation do not increase the existing disparities between regions, actually alleviate them to an extent similar to public investment. Only in the group of five provinces with the lowest level of economic development is the private investment outlay growth rate lower. Therefore, it is difficult to talk about their approaching the average level of economic development.

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THE ANALYSIS OF A TOTAL AND SYSTEMATIC RISK IN THE CONTEXT OF A DOWNSIDE RISK BASED ON THE EXAMPLE OF CAPITAL INVESTMENTS AT WARSAW STOCK EXCHANGE

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K e y w o r d s: asymmetric measures of risk, downside risk, downside beta coefficients.

A b s t r a c t

Investments in large, medium and small companies listed at Warsaw Stock Exchange in the aspect of the downside risk were the major subject of the studies. For the analyzed companies, in addition to the variances and classic beta coefficients their downside equivalents, i.e. semivariances and semi-betas were determined. It was shown that companies of different size are characterized by the different levels of total and systematic risk. Additionally, semi-betas, being the measures of the downside systematic risk, are much stronger correlated with the profitability achieved than their classical equivalents.

ANALIZA RYZYKA CAŁKOWITEGO I SYSTEMATYCZNEGO W UJĘCIU DOLNOSTRONNYM INWESTYCJI KAPITAŁOWYCH W AKCJE SPÓŁEK NOTOWANYCH NA GPW W WARSZAWIE

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S ł o w a k l u c z o w e: asymetryczne miary ryzyka, ryzyko dolnostronne, dolnostronne współczynniki beta.

A b s t r a k t

Głównym przedmiotem badań były inwestycje w duże, średnie i małe spółki notowane na GPW w Warszawie, w aspekcie ryzyka dolnostronnego. Dla analizowanych spółek wyznaczono, oprócz wariancji i klasycznych współczynników beta, ich dolnostronne odpowiedniki, tzn. semiwariancję

i semibety. Wykazano, że spółki o różnej wielkości charakteryzują się odmiennym poziomem ryzyka całkowitego i systematycznego. Ponadto semibety, będące miarami dolnostronnego ryzyka systematycznego, są znacznie silniej skorelowane z osiąganymi rentownościami niż ich klasyczne odpowiedniki.

Introduction

The portfolio theory and valuation of securities according to the classical market equilibrium models, in particular the CAPM model, are based mainly on the assumption of normal distribution of the rates of return on securities and treatment of variance as the basic risk measure. While determination of distribution normality is, in most cases, subject to empirical verification, the assumption of variance, as the only appropriate risk measure seems to contradict intuition. According to the variance, the investors treat very high and very low rates of return as equally undesired. In reality, in line with rational decision taking, only the negative deviations are undesired as the positive ones create opportunities for high profit achievement. The negative attitude of investors concerning the rates of return lover than the level assumed causes that the asymmetric measures of systematic risk, in particular the measures of the downside risk should be treated as the appropriate measures of that risk. The left-sided risk perception allows repealing the assumption on normality of the rates of return distribution. The investors will prefer stocks with the lower downside level of systematic risk.

According to the above, the variance ceases to be the appropriate measure of the risk, while the measure reflecting the downside risk becomes desired. The semivariance, which is the average of the deviations below a defined level (MARKOWITZ 1959), is the basic measure for the negative deviations. Semivariance measures the downside variance only and in that sense it is believed to be a better risk measure than the variance. Semivariance is the so-called lower partial moment-lpm of the second order of the distribution of rates of return. The lower partial moments in approximation of downside risk are also reflected in the design of systematic risk measures such as the beta coefficient. The consequence of that are the downside beta coefficients that are of major importance in measurement and pricing of the capital investments risk (BAWA, LINDENBERG 1977, ESTRADA 2007, FISHBURN 1977, RUTKOWSKA-ZIARKO, MARKOWSKI 2009).

The paper aimed at the analysis of total and systematic risk, in particular in the aspect of downside risk, of capital assets listed at Warsaw Stock Exchange. The risk analysis was conducted for the companies included in the indexes representing the segments of large, medium and small enterprises.

Total and systematic risk according to the downside approach

Variance is the classic total risk measure in the finance theory. For the first time that statistical measure of dispersion was used for risk measurement by MARKOWITZ (1952). In practice, the value of variance is estimated on the base of empirical time series of the rates of return, the higher was the past variance of profitability of a certain stock the more risky it is considered:

$$s_i^2 = \frac{\sum_{t=1}^{m} (z_{it} - \bar{z}_i)^2}{m - 1} \tag{1}$$

where:
z_{it} – rate of return during period t for the stock exchange listed company i,
m – number of time units,
$\bar{z}_i$ – average rate of return for the stock exchange listed company i, estimated on the base of the historical data:

$$\bar{z}_i = \frac{1}{m} \sum_{t=1}^{m} z_{it} \tag{2}$$

The same treatment of negative and positive deviations from the average rate of return is the fundamental defect of variance as risk measure. In reality, negative deviations are undesired while the positive ones create opportunities for higher profit. Markowitz proposed semivariance, which is the average of deviations below the defined level for measurement of the negative deviations only (MARKOWITZ 1959).

$$ds_i^2 (l) = \frac{\sum_{t=1}^{m} d_{it}^2 (l)}{m - 1} \tag{3}$$

where:

$$d_{it} (l) = \begin{cases} 0 & \text{dla } z_{it} \geq l \\ z_{it} - l & \text{dla } z_{it} < l \end{cases} \tag{4}$$

$ds_i^2 (l)$ – semivariance for the stock exchange listed company i,
l – equal to the average rate of return or the rate of return proposed by the investor.

The rate proposed by the investor may be a risk-free rate changing from period to period. Then we will receive the following formula for semivariance for the risk-free rate of return:

$$ds_i^2(f) = \frac{\sum_{t=1}^{m} d_{it}^2(f)}{m-1} \tag{5}$$

where:

$$d_{it}(l) = \begin{cases} 0 & \text{dla } z_{it} \geq z_{ft} \\ z_{it} - z_{ft} & \text{dla } z_{it} < z_{ft} \end{cases} \tag{6}$$

z_{ft} – risk-free rate of return during the period t.

Defining of the lower partial moments by BAWA (1975) and FISHBURN (1977) represented elaboration and generalization of semivariance as a risk measure. According to those authors the following expression is called the lower partial moment of degree n for stock i:

$$\text{LPMU}_i^n = \frac{1}{m} \sum_{t=1}^{m} lpm_{it}^n \tag{7}$$

where:

$$lpm_{it} = \begin{cases} 0 & \text{dla } z_{it} \geq l \\ z_{it} - l & \text{dla } z_{it} < l \end{cases} \tag{8}$$

Let us notice that for the lower partial moment is equal to the semivariance. The higher is the value of n the higher is the weight of high deviations below the assumed degree in the total value of the downside total risk. The level of the lower partial moment is related to the aversion of the investor to the risk, the higher the degree the higher is the aversion to the risk. The issue of the choice of the specific risk measure to a given investor or rather the utility function suitable for him becomes visible hear. In studies on the capital market that issue is generally disregarded and it is only assumed that the investor is characterized by aversion to risk and that he prefers higher rates of return to the lower ones. In that case semivariance, among others, can be the appropriate risk measure (MARKOWITZ 1959).

Application of classical beta (β_i) is linked to assuming the variance as the risk measure. Downside betas (β_i^{LPM}) on the other hand, are determined on the base of semivariance and other lower partial moments. In literature many types of lower betas have been identified dividing them according to the risk measure assumed and the reference point, which can be, e.g. the average, the risk-free rate or any assumed rate of return (ESTRADA 2007, KAPLANSKI 2004, GALAGEDERA, BROOKS 2007). Classical beta coefficients, as opposed to downside betas, assume one standard formula of regression coefficients in the Sharpe's model that has the form of:

$$z_{it} = \alpha_i + \beta_i z_{Mt} + \eta_{it} \tag{9}$$

where:

$$\beta_i = \frac{\mathrm{COV}_{iM}}{s_M^2} \tag{10}$$

z_{Mt} – market portfolio rate of return in the period t,
COV_{iM} – covariance of the rate of return for stock i and market portfolio rates of return,
s_M^2 – variance of market portfolio rates of return,
η_{it} – random component of the model.

In this study the assumption was made for determination of downside betas that the reference point is the risk-free rate changing its value from period to period (see: PRICE et al., 1982). Additionally the asymmetric mixed lower partial moment of second degree assuming the following format was used:

$$\mathrm{CLPM}_i^2 = \frac{1}{m} \sum_{t=1}^{m} (z_{it} - z_{ft})\ lpm_{Mt} \tag{11}$$

where:

$$lpm_{Mt} = \begin{cases} 0 & \text{dla } z_{Mt} \geq z_{ft} \\ z_{Mt} - z_{ft} & \text{dla } z_{Mt} < z_{ft} \end{cases} \tag{12}$$

where:
CLPM_i^2 – asymmetric mixed lower partial moment of second degree for stock exchange listed company i,
z_{ft} – risk-free rate of return during the period t.

The computation formula for the asymmetric mixed lower partial moment of second degree resembles the formula of classic covariance. It can be treated as the downside equivalent of that statistical measure. The value of the asymmetric mixed lower partial moment of second degree increases only when the rate of return for the stock and the market rate of return are simultaneously lower than the risk-free rate (see: HOGAN, WARREN 1974), which is presented in Table 1.

Table 1

Signs of the components of summing up in arithmetical computation of the asymmetric mixed lower partial moment of second degree depending on the market situation

Relation	$z_{Mt} < z_{ft}$	$z_{Mt} \geq z_{ft}$
$z_{it} < z_{ft}$	+	0
$z_{it} \geq z_{ft}$	–	0

Source: own work based on (HOGAN, WARREN 1977).

Considering (7) and (11), the downside betas determined according to the formula (see PRICE et al. 1982):

$$\beta_i^{\mathrm{LPM}} = \frac{\mathrm{CLPM}_i^2}{\mathrm{LPM}_M^2} = \frac{\mathrm{CLPM}_i^2}{ds_{\mathrm{M}}^2(f)} \tag{13}$$

where:

$ds_{\mathrm{M}}^2(f)$ – emivariance of the market portfolio determined in relation to the risk-free rate of return.

In case of the here presented approach, in determination of the downside beta coefficients the periods during which the market rate of return is higher than the risk-free rate of return are disregarded.

Results

The study encompassed companies listed at Warsaw Stock Exchange included in the indexes: WIG20, WIG40 and WIG80. The study was based on monthly rates of return for the analyzed stocks listed during the years 2000–2008. In total 59 companies listed at the stock exchange without interruption during the entire period covered by the study were analyzed. The companies were divided into three groups according to the size into large, medium and small companies. For each stock the average monthly rate of

return was computed and according to increasing value of that parameter the companies were ranked within groups. For all the companies the variance, semivariance from the risk-free rate of return, classic beta coefficient and downside beta coefficient were computed. Also the difference between the betas ($\beta_i - \beta_i^{\mathrm{LPM}}$) was determined, which represents the surplus of systematic double-sided risk above the downside systematic risk. The asymmetry coefficients (A) were computed and their significance for $\alpha = 0.05$ was tested. Significant asymmetry coefficients are presented in the following table in bold. The agreement of the distributions of rates of return for the analyzed companies with the normal distribution was tested by means of the Shapiro-Wilk test.

The results presented in Tables 2, 3 and 4 indicate that the majority of the companies studied are characterized by significant right-sided asymmetry. Only in case of seven companies consistency with normal distribution was recorded at the significance level of 0.05. In such a situation application of downside measures in risk analysis is justified.

During the period covered, the individual groups of companies were characterized by similar profitability, and the highest average rate of return was achieved by small companies. The differences between the average rates of return for the groups of large, medium and small companies were insignificant statistically. As concerns the total risk, it was the highest in case of small companies and the lowest in case of large ones. As concerns the systematic risk the opposite relation can be noticed that is, large companies showed stronger reaction to market changes while the small ones showed the weakest reaction. In case of large and medium companies the values of beta coefficients were, in average, higher than the values of semi-betas. This means, in general, that large and medium companies shower stronger reaction to changes in the stock exchange market during the periods of decrease as compared to the entire period. Small companies, on the other hand, react weaker to decreases in the market rate of return below the risk-free rate than to the fluctuations of the WIG index over the entire period. Considering the statistically the same level of the average rates of return, small companies are characterized by the highest level of the total risk and at the same time the lowest level of the systematic risk. The total risk can be decreased by appropriate selection of stocks for the portfolio while the systematic risk cannot be diversified and in that context investments in small companies are more attractive for the investor.

Further, the presence of correlation between the selected distribution parameters was tested using the Pearson's linear correlation coefficient (table 5). The significant coefficients ($\alpha = 0.05$) are presented in bold.

Table 2

Selected distribution parameters and risk measures for companies belonging to WIG20 index during the period of I 2000–XII 2008

Company	$\bar{z}_i$	s_i^2	$ds_i^2(f)$	A	β_i	β_i^{LPM}	$\beta_i - \beta_i^{LPM}$	S–W
AGO	-0.489	159.673	65.499	**1.728**	1.081	1.089	-0.008	
TPS	0.119	93.817	43.785	**0.851**	0.943	0.845	0.098	
PKN	0.357	74.301	39.215	0.035	0.953	0.974	-0.021	
ACP	0.835	247.416	105.380	**0.616**	1.364	1.266	0.098	
KGH	0.920	165.446	81.971	-0.235	1.360	1.328	0.032	
BRE	1.104	142.372	75.250	-0.453	1.233	1.299	-0.066	
PEO	1.171	77.072	35.249	0.019	1.011	0.977	0.034	consistent
CST	2.486	140.723	38.666	**1.163**	0.933	0.609	0.324	
PXM	2.594	248.423	74.567	**1.138**	1.249	1.023	0.226	consistent
PND	2.955	613.449	126.565	**2.246**	1.410	1.183	0.227	
In average	**1.205**	**196.269**	**68.615**	**0.711**	**1.154**	**1.059**	**0.094**	

Source: Own computations.

Table 3

Selected distribution parameters and risk measures for companies belonging to WIG40 index during the period of I 2000 – XII 2008

Company	$\bar{z}_i$	s_i^2	$ds_i^2(f)$	A	β_i	β_i^{LPM}	$\beta_i - \beta_i^{LPM}$	S–W
STX	-0.774	357.239	165.640	**0.856**	1.158	1.462	-0.304	
MIL	-0.551	165.387	95.331	0.039	1.355	1.592	-0.237	consistent
KRB	-0.100	76.870	46.031	-0.215	0.669	0.886	-0.217	consistent
BPH	0.073	165.673	126.721	**-3.375**	1.016	1.104	-0.088	
PGF	0.118	85.130	51.663	**-0.683**	0.616	0.844	-0.228	
BHW	0.153	75.083	43.107	-0.061	0.638	0.777	-0.140	
ORB	0.544	138.389	61.312	**0.585**	1.212	1.149	0.063	
KTY	0.629	113.486	53.587	**0.283**	0.867	0.885	-0.017	
BSK	0.737	70.250	36.065	-0.169	0.629	0.739	-0.110	consistent
MSZ	0.963	457.322	175.630	**0.808**	1.603	1.650	-0.047	
MSX	1.057	451.462	126.612	**2.449**	1.383	1.121	0.262	
ECH	1.094	195.972	104.198	**-0.707**	1.202	1.285	-0.083	
BDX	1.207	142.060	51.917	**0.688**	0.790	0.656	0.134	
GRJ	1.213	140.744	66.057	-0.015	0.744	0.647	0.097	
VST	1.556	275.102	85.398	**1.524**	0.805	0.715	0.090	
SNW	1.909	584.047	207.185	**0.790**	1.328	1.086	0.242	
ELB	1.936	122.756	36.432	**1.051**	0.736	0.554	0.182	
KPX	2.539	375.857	116.185	**1.086**	1.211	1.220	-0.010	
STP	4.453	246.348	58.447	**0.838**	0.801	0.499	0.302	
In average	**0.987**	**223.115**	**89.869**	**0.304**	**0.988**	**0.993**	**-0.006**	

Source: Own computations.

Table 4

Selected distribution parameters and risk measures for companies belonging to WIG80 index during the period of I 2000 – XII 2008

Company	$\bar{z}_i$	s_i^2	$ds_i^2(f)$	A	β_i	β_i^{LPM}	$\beta_i - \beta_i^{\mathrm{LPM}}$	S–W
SWZ	-1.252	353.604	150.908	**1.489**	1.219	1.269	-0.050	
ADS	-1.050	179.508	89.715	**0.978**	0.693	0.734	-0.041	
PWK	-0.194	484.467	200.626	**1.112**	1.231	1.529	-0.298	
SGN	-0.010	186.559	86.298	**0.823**	0.773	0.804	-0.031	
IBS	0.223	522.077	180.203	**1.355**	1.236	1.180	0.057	
DBC	0.347	96.473	50.033	-0.295	0.643	0.839	-0.195	
BOS	0.352	54.243	23.245	**0.995**	0.299	0.316	-0.017	
LTX	0.354	243.769	95.431	**1.028**	0.991	0.942	0.048	
JPR	0.597	305.603	106.761	**1.690**	0.659	0.762	-0.103	
RFK	0.737	262.697	124.822	-0.105	1.001	1.029	-0.028	
MNI	0.860	508.195	196.794	**1.589**	1.240	1.153	0.087	
CMR	1.019	235.980	88.568	**1.016**	1.391	1.250	0.141	
SNK	1.102	150.716	50.962	**1.452**	0.756	0.727	0.029	
FCL	1.290	135.602	79.275	**-1.697**	0.693	0.794	-0.101	
PRC	1.396	1215.967	171.366	**5.611**	0.878	0.835	0.043	
KZS	1.406	556.828	163.216	**2.383**	0.726	0.864	-0.138	
MSC	1.419	123.073	61.625	-0.435	0.645	0.538	0.107	
PJP	1.474	185.330	61.731	**0.921**	0.845	0.674	0.171	
EPD	1.491	301.703	131.467	0.134	0.974	0.899	0.075	consistent
CSG	1.600	378.279	92.550	**1.992**	1.102	0.950	0.152	
IPX	1.974	304.748	114.593	0.450	1.343	1.194	0.149	consistent
MSW	2.027	246.116	95.798	**0.861**	0.455	0.381	0.074	
PGD	2.094	618.783	103.176	**3.682**	1.613	1.230	0.383	
ALM	2.350	244.882	80.991	**0.846**	1.007	0.669	0.338	
TIM	2.371	375.052	152.847	0.110	1.368	1.201	0.167	
BTM	2.377	407.603	136.554	**0.803**	0.827	0.612	0.215	
YWL	2.606	590.148	134.343	**1.816**	0.911	0.769	0.142	
APT	2.734	159.918	52.720	**0.557**	0.481	0.425	0.056	
ATS	2.852	1129.666	154.949	**3.766**	1.439	0.642	0.797	
BRS	2.997	389.407	95.354	**1.793**	1.406	1.141	0.266	
In average	**1.251**	**364.900**	**110.897**	**1.224**	**0.961**	**0.878**	**0.083**	

Source: Own computations.

Table 5

Pearson's linear correlation coefficients between selected distribution parameters for companies listed in WIG20, WIG40, WIG80 indexes during the period of I 2000 – XII 2008

Parameter	$\bar{z}_i$	s_i^2	$ds_i^2(f)$	A	β_i	β_i^{LPM}	$\beta_i - \beta_i^{LPM}$
$\bar{z}_i$	1.000	**0.318**	0.010	**0.261**	0.112	**-0.319**	**0.707**
s_i^2	**0.318**	1.000	**0.747**	**0.753**	**0.438**	0.179	**0.433**
$ds_i^2(f)$	0.010	**0.747**	1.000	**0.334**	**0.534**	**0.509**	0.053
A	**0.261**	**0.753**	**0.334**	1.000	0.236	-0.043	**0.463**
β_i	0.112	**0.438**	**0.534**	0.236	1.000	**0.816**	**0.323**
β_i^{LPM}	-0.319	0.179	**0.509**	-0.043	**0.816**	1.000	**-0.284**
$\beta_i - \beta_i^{LPM}$	0.707	0.433	0.053	**0.463**	**0.323**	**-0.284**	1.000

Source: Own computations.

The average profitability is correlated the strongest with the difference in betas. Significant correlations also exist between the average rate of return and the variance as well as asymmetry and downside beta coefficient. The fact of existence of significant correlation between the average and the variance coupled with lack of correlation with the classic beta is worth considering. No linear correlation was found between the semivariance and profitability but there is correlation between profitability and downside beta. It can be noticed that there is significant correlation between total risk measures and asymmetry. This means that asymmetry is an important aspect of investment at Warsaw Stock Exchange.

Conclusion

The studies conducted on the base of ten years monthly time series of rates of return for companies listed at Warsaw Stock Exchange show that the distributions of rates of return on investments in those companies very frequently diverge from the normal distribution. The study of downside risk, in case the assumption of normality of distributions of rates of return, is of major importance in managing (constructing) the securities portfolios.

Analysis of the risk of capital investments shows additionally the differences in its level for securities included in the indexes of small, medium and large companies. In case of statistically the same profitability level, large companies are characterized by the lowest level of the total risk while that risk is the highest in case of small companies. The level of systematic risk, in particular downside beta coefficients, which cannot be eliminated in the process of combining stocks into portfolios, is more important from the perspective of

risk perception and diversification. The lowest values of that risk are achieved by small companies and in that context they seem the most attractive.

Significance tests of the linear correlation between selected parameters of distribution of rates of return showed existence of significant correlations between downside betas and the difference between betas with average rates of return as opposed to the lack of statistically significant correlation between the average rates of return and classic beta coefficients.

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REINSURANCE MANAGEMENT IN INSURANCE COMPANIES IN CASE OF GENERAL THIRD PARTY INSURANCE

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K e y w o r d s: reinsurance and its types, general third party insurance, risk.

A b s t r a c t

The aim of the study was to assess the methods of reinsurance management in insurance companies operating in the Polish market during the years 2004–2008. Determination of reinsurance applied by insurance companies in each of the eighteen groups of section II insurance types (according to the Act on insurance activities), including also the discussed group thirteen, i.e. in general third party insurance nit included in groups from nine through twelve was the base for the assessment. Each reinsurance type defines the risk sharing, that is the liability of the insurance company (the assignor) and reinsurer in case of insurance damage, in a different way. The reinsurance method and the scope of damage also influence the reinsurer's commission and the share in profits of the reinsurers that insurance companies receive from the reinsurers. The values of those financial parameters have a very large influence on the operational results of insurance companies as concerns the balance or reinsurance operations, which should oscillate around zero in a longer time perspective.

ZARZĄDZANIE REASEKURACJĄ W ZAKŁADACH UBEZPIECZEŃ W PRZYPADKU UBEZPIECZENIA ODPOWIEDZIALNOŚCI CYWILNEJ OGÓLNEJ

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S ł o w a k l u c z o w e: reasekuracja i jej rodzaje, ubezpieczenia odpowiedzialności cywilnej ogólnej, ryzyko.

A b s t r a k t

Celem badań jest ocena sposobu zarządzania reasekuracją w zakładach ubezpieczeń działających na rynku polskim w latach 2004-2008. Podstawą oceny jest ustalenie rodzaju reasekuracji stosowanych przez zakłady ubezpieczeń w każdej z osiemnastu grup działu II ubezpieczeń (według

ustawy o działalności ubezpieczeniowej), w tym również w omawianej grupie trzynastej, czyli w ubezpieczeniach odpowiedzialności cywilnej ogólnej, nie ujętych w grupach od dziesiątej do dwunastej. Każdy rodzaj reasekuracji inaczej określa sposób podziału ryzyka, a tym samym sposób odpowiedzialności zakładu ubezpieczeń (cedenta) i reasekuratora w przypadku wystąpienia szkody u ubezpieczonego. Sposób reasekuracji oraz zakres szkody wpływa też na wielkość prowizji reasekuracyjnej i udział w zyskach reasekuratorów, jakie zakłady ubezpieczeń uzyskują od reasekuratorów. Wartości tych wielkości finansowych mają bardzo duży wpływ na wyniki działalności zakładów ubezpieczeń w zakresie m.in. uzyskiwanego salda operacji reasekuracyjnych, które w dłuższym czasie powinno oscylować wokół zera.

Introduction

Reinsurance is the contract made between the insurer and the reinsurer according to which the division or assignment of risk takes place in such a way that the insurer still remains solely and exclusively responsible directly to the insured (MONKIEWICZ 2000, p. 126). The parties to the reinsurance contract are the insurer (insurance company) that is referred to as the assignor (as it assigns, i.e. transfers a part of the insurance contracted) and the reinsurer, which any professional reinsurer or any insurance – reinsurance company licensed for reinsurance activities can be, that accepts from the assignor a part of the insurance contracted or of a set of insurance contracts made (DARUL 1994, p. 11). The reinsurance contracts contain the same basic elements as the insurance contract, i.e. the risk, premium and benefit. Additionally, the same basic principles as in case of the insurance contracts, that is the principle of good will, the principle of indemnity and the principle of the so-called interest in the insurance apply to reinsurance contracts (DUDKOWIAK 1994, p. 214). The fundamental difference between those contracts is that no legal relation is established between the insuring and the reinsurer as a consequence of the reinsurance contract although the insurance and reinsurance are harmonized with one another and are mutually complementary. The insurance fulfils the same role as the reinsurance because the insurance fulfils the role of a factor protecting the economic stability of the entity insured and reinsurance fulfils the role of the factor protecting the financial stability of the insurer, that is it provides the insurer protection equivalent to that provided by the insurer provides to its insured. It is believed that stabilisation of the insurer;s financial results is the most important function of reinsurance. Contemporary insurances could not exist without reinsurance, particularly in case of encompassing risks of catastrophic character with insurance coverage as reinsurance allows balancing the fluctuations in the financial results of insurance activity resulting from occurrence of catastrophic risks insured. The same situation could also appear in case of immense concentration of ordinary (normal) risks, such as, for example, risks concerning general third party liabilities of the insured realised within a certain period of time.

Methodology and objective of study

Obtaining knowledge on and assessment of the reinsurance management methods in insurance companies operating in the Polish market during the years 2004–2008 was the main objective of the study. The studies were conducted during the second half of 2008. Until now data was obtained from insurance companies with almost 70% total share in the section II insurance market that encompasses the other personal and property insurance (*Act*... 2003). Determination and assessment of the reinsurance types applied by the insurance companies in each of the eighteen groups of section II insurances, including the here discussed group thirteen (i.e. general third party insurance not included in groups 10–12) and determination of heir influence on the financial results of the insurance companies as concerns, among others, the balance of reinsurance operations obtained, was the special objective of the study.

Group 13. Third party insurances (general third party insurances) not included in groups 10–12

Third party insurance (OC) (general third party insurances) are the insurances included in group thirteen and not included in groups ten (i.e. third party insurances of all types resulting from possession and operation of land motor vehicles, including the insurance of the carrier's liability), eleven (i.e. third party insurances of all types resulting from possession and operation of aircrafts, including the carrier's liability) and twelve (third party insurances of all types of maritime and inland navigation operations resulting from possession and operation of inland and maritime vessels, including insurance of the carrier's liability), that cover many other groups of insurances. Those include, for example, the professional indemnity cover (OC) of different professional groups, including indemnity cover of brokers, court enforcement officers, organizers of mass events, organizers of tourism, indemnity cover of some legal professions (notaries, advocates, legal advisors), indemnity cover of tax advisors or indemnity cover of entities accepting orders for providing health services for damages caused in providing those services. There are also so-called contractual insurances, i.e. for example, indemnity cover for nuclear damages, indemnity cover for oil damages (*International*... 1969), and product indemnity cover (the liability of the producer for damages to people or property incurred by third parties as a consequence of using, applying or consuming the product specified in the insurance contract is the subject of that insurance). Third party insurances of individuals in private life (third party tortuous insurance) represent a separate group. Protection of the property interest of

the insured is the basic objective of the third party insurance. It is also assumed that the third party insurance also protects the property of the victim, as the nature of the insurance cover represents assuring performance of the liability to the victim, even when the value of damages exceeds the capacity of the party that caused those damages (the insured). When the damages disbursed by the insurance company are lower than the actual value of the damage, the debtor, and at the same time the insured, can be committed to cover that difference (*Podstawy*... 2002). In this case we deal with protection of the victim against insolvency of the cause of the damage (the insured). As a consequence of the regime of liability, third party insurances are divided into the third party tortuous insurances and third party contractual insurances. The third party tortuous insurance, i.e. insurances of the liability resulting from a prohibited act, include, for example, third party insurance of real property owners, third party insurance for hunters or amateur sportsmen. On the other hand the examples of the third party contractual insurances covering damages caused as a consequence of non-performance or inappropriate performance of a commitment include insurances covering operation of hotels, pensions, inns and other similar facilities or insurance of non-performance or inappropriate performance of a trade contract. In the European insurance statistics the general third party coverage includes mainly the liability in private life, liability for public activity and product liability, so it represents a slightly different type of classification than that assumed in the Polish Act on insurance activity, which also includes the professional indemnity cover of professional groups.

Reinsurance in group 13 of insurances, that is in third party insurances (general third party insurances) not included in groups 10–12

In reinsurance practice different forms, types and kinds of reinsurance contracts have developed. The basic reinsurance forms are the facultative reinsurance, compulsory reinsurance and facultative-compulsory reinsurance. In the facultative reinsurance contract each risk (or group of risks) is reinsured individually and the level of reinsurance premium is independent of the premium collected by the insurer from the insured. This means that those contracts leave to the parties the total freedom of decision concerning both the offering of the share in a given risk by the insurer (assigner) to the reinsurer and to the reinsurer as concerns acceptance of the share offered. In the compulsory reinsurance contract the insurer (assigner) commits itself to transfer and the reinsurer to accept all the risks specified in the contract. The reinsurer automatically covers all the risks specified in the contract. The

facultative-compulsory reinsurance contracts are also called the open cover contracts leaving to the insurer the freedom in deciding which risks and to what extent it wants to assign the shares to the reinsurer while the reinsurer is committed to accept the shares assigned to it on terms and conditions agreed in advance.

Considering the method of risk sharing between the insurer (assigner) and the reinsurer the reinsurance contracts are divided into proportional and non-proportional ones (KOWALEWSKI 2006, p. 471). The size of the insurance sums is the subject of proportional reinsurance while the share of the reinsurer in each risk is fixed as a specified proportion to the own share of the insurer. Also the share of the reinsurer in premiums and damages is set at the same proportions as his share in the risk. In non-proportional reinsurance the damage or loss burden is the subject of reinsurance, that is the individual risks (insurance sums) are not assigned for reinsurance and only the participation method of the reinsurer in damages is set. This not only simplifies servicing of non-proportional reinsurance contracts as compared to the proportional ones, but also secures the insurers (assigners) as concerns their financial balance against the consequences of accumulation of average risks. Among the types of non-proportional reinsurance the contracts of non-proportional reinsurance of the surplus of damages per risk or contracts of non-proportional reinsurance of the surplus of damages per event are most frequently applied. In the discussed group of third party insurances no applications of non-proportional reinsurance of the loss burden surplus was found.

Results of own studies and discussion

The basic data characterizing the reinsurance management process in the insurance companies in the Polish market during the years 2004–2008 are presented in Tables 1, 2, 3 and 4, as well as Figures 1 and 2. Table 1 presents the premiums, damages and benefits as well as reinsurance commissions in group thirteen of section II of insurances. It indicates that during the years 2004–2008 gross written premiums increases by 12–16% year to year while the share of the reinsurers in the gross written premium showed the decreasing trend (26,67% in 2004 and 17,68% in 2008). The gross damages and benefits achieved the highest increase in 2005 (42%) and during the consecutive years they stayed at a very similar level while in 2008 they increased by 28%. The percentage share of reinsurers in gross damages and benefits reached the highest level in 2006 (19,60%) and the lowest in 2007 (14,17%). Reinsurance commissions and shares in the profits of reinsurers represent an important item in the finances of the insurers. Their size sometimes exceeds the share of reinsurers in the gross damages and benefits (e.g. for 2004). It is usually so

that the higher the percentage share of reinsurers in the damages and benefits the lower the reinsurance commissions and shares in the profits of reinsurers are. This results, first of all, from the change in the conditions of reinsurance contracts made between the insurers and reinsurers and is a consequence of the analysis of fortuitous events during the preceding years causing the necessity for disbursing damages and benefits at a higher or lower level.

Table 1
Premiums, damages and benefits as well as reinsurance commissions in group thirteen section II of insurances (general third party insurances) during the years 2004–2008

Item	2004 [K PLN]	2005 [K PLN]	2006 [K PLN]	2007 [K PLN]	2008 [K PLN]
I. Gross written premiums	706 743	821 256	821 373	864 041	973 378
1. Share of reinsurers in gross written premium	160 236	182 688	182 786	168 641	172 120
2. Percentage share of reinsurers in gross written premium	22.67	22.25	22.25	19.52	17.68
II. Gross damages and benefits	187 539	266 702	266 541	261 496	335 643
1. Damages and benefits disbursed from own share	153 712	214 447	214 288	224 448	287 474
2. Share of reinsurers in the disbursed damages and benefits	33 827	52 255	52 253	37 047	48 170
3. Percentage share of reinsurers in gross damages and benefits	18.04	19.52	19.60	14.17	14.35
III. Reinsurance commissions and share in profits of reinsurers	36 926	31 659	31 784	35 955	34 881

Source: own work based on: www.knf.gov.pl/rynek ubezpieczeń/dane o rynku. 17.11.2009.

Insurance companies should monitor continually the profitability of reinsurance operation, in particular the analysis of passive reinsurance profitability, which in a longer time perspective should oscillate around zero percent (*Metodologia*... 2001, p. 112). The passive reinsurance profitability ratio is defined as the ratio of the reinsurance operation balance to gross premiums that is the balance of reinsurance operation within a longer period should oscillate around zero. The quality of reinsurance programs applied by individual insurance companies has a large influence on the level of reinsurance operations balance (CIUMAN 2007, p. 77). According to the data in table 2, the balance of reinsurance operations for group thirteen section II of insurances during the years 2004–2008 was always negative and during the years

2004–2006 showed an increasing trend while during the years 2007–2008 a decreasing one. The period of five years covered by the study for sure is not a longer time perspective, however, it shows the level of the balance, which was not only negative during the consecutive years but also has a relatively high value. This means that insurance companies should prepare their reinsurance programs more carefully so that the decreasing trend of that balance should be visible more clearly because with the current value of that balance even a longer time perspective would not allow obtaining even the estimated value of the reinsurance profitability ratio value close to zero percent.

Table 2
Simplified balance of reinsurance operations for group thirteen section II of insurances during the years 2004–2008.

Item	Group thirteen section II of insurances (general third party insurances) in individual years				
	2004 [K PLN]	2005 [K PLN]	2006 [K PLN]	2007 [K PLN]	2008 [K PLN]
I. Share of reinsurers in the premium	160 236	182 688	182 786	168 641	172 120
II. Share of reinsurers in gross disbursed damages and benefits	33 827	52 255	52 253	37 047	48 170
III. Reinsurance commissions and shares in the reinsurer's profits received	36 926	31 659	31 784	35 955	34 881
IV. Balance = –I+II+III[a]	–89 483	–98 774	–98 749	–95 639	–89 069

[a] – the balance does not include: 1) the share of reinsurers in the amount of provisions for not disbursed damages and benefits, 2) revenues of the reinsurer from deposits of premium.

Source: own work based on: www.knf.gov.pl/rynek ubezpieczeń/dane o rynku. 17.11.2009.

Table 3 presents the results of studies concerning the reinsurance types applied by insurance companies in group thirteen section II of insurances during the years 2004–2008. Out of the existing types of reinsurance the facultative and compulsory non-proportional reinsurance of loss burden were not applied. Compulsory proportional amount reinsurance followed by the facultative proportional reinsurance had the highest share in the market (from the perspective of the premiums amount). The types of non-proportional reinsurance were the least frequently applied and in this case they were only the facultative non-proportional reinsurance of the surplus of damages and compulsory non-proportional reinsurance of the surplus of damages per event.

Table 3

Types of reinsurance applied in group thirteen section II of insurances (general third party insurances) and premiums passed to reinsurers during the years 2004–2008

Item	Types of reinsurance applied in group thirteen section II of insurances (general third party insurances) during individual years				
	2004	2005	2006	2007	2008
Facultative proportional					
Premiums passed to reinsurers [M PLN]	10.82	9.75	9.78	5.07	9.15
Facultative non-proportional of surplus of damages					
Premiums passed to reinsurers [M PLN]	2.2	0.51	0.60	7.26	2.44
Compulsory proportional amount based					
Premiums passed to reinsurers [M PLN]	41.2	29.2	30.1	29.3	27.9
Compulsory non-proportional of surplus of damages per event					
Premiums passed to reinsurers [M PLN]	2.98	3.01	2.96	3.40	4.43

Source: own work based on the author's program "Reinsurance management in insurance companies under conditions of socioeconomic transformation based on the example of Poland during the years 2004–2008" (data from insurance companies with the combined almost 70% share in the market of section II insurances).

Table 4 presents the data in the most typical system of reinsurance by type that is divided into proportional and non-proportional as well as facultative and compulsory reinsurance. The fact that proportional reinsurance (both facultative and compulsory) was many times more extensive in scope (from the perspective of the value of premiums transferred to reinsurers during the years 2004–2005 than non-proportional reinsurance (also see figure 1) deserves noticing. However, as of 2007, the share of non-proportional reinsurance increased significantly. This means that the insurers, increasingly often opt for protection against the consequences of high damages as well as damages of catastrophic character. In this case the reinsurer is responsible for damages higher than the parity and only to the level of the reinsurance coverage limit (coverage layer) while the assigner (insurance company) covers the damages to the parity level and those above the upper limit of the reinsurer;s coverage layer. Considering the facultative and compulsory reinsurance, the compulsory reinsurance representing in average around 75% of the reinsurance market had the dominating position (also see figure 2).

Table 4

Reinsurance types and relations between them and premiums transferred to reinsurers within the frameworks of group thirteen section II insurances (general third party insurance) during the years 2004–2008

Reinsurance types	Group thirteen section II of insurances (general third party insurances) in individual years				
	2004	2005	2006	2007	2008
Proportional (premium in M PLN)	52.02	38.95	39.88	34.37	37.05
Non-proportional (premium in M PLN)	5.18	3.52	3.56	10.66	6.87
Percentage relations between *proportional and non-proportional* reinsurance premiums (total 100%)	90.94 / 9.06	91.71 / 8.29	91.80 / 8.20	76.32 / 23.68	84.36 / 15.64
Facultative (premium in M PLN)	13.02	10.26	10.38	12.33	11.59
Compulsory (premium in M PLN)	44.18	32.21	33.06	32.70	32.33
Percentage relations between *facultative and compulsory* reinsurance premiums (total 100%)	22.76 / 77.24	24.16 / 75.84	23.90 / 76.10	27.38 / 72.62	26.39 / 73.61

Source: own work based on the author's program "Reinsurance management in insurance companies under conditions of socioeconomic transformation based on the example of Poland during the years 2004–2008" (data from insurance companies with the combined almost 70% share in the market of section II insurances).

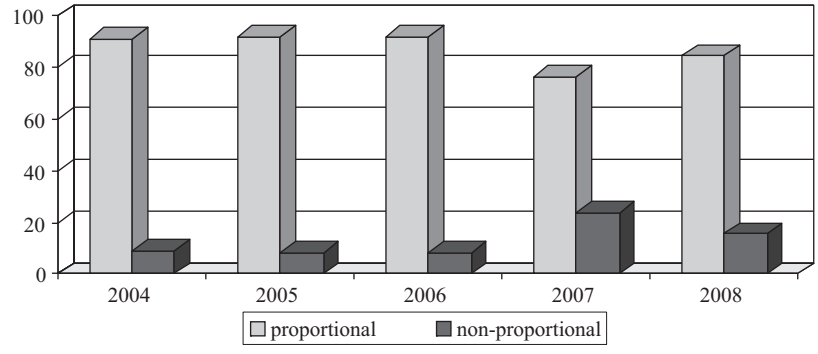

Fig. 1. Percentage share of premiums in proportional and non-proportional reinsurance in group thirteen (general third party insurance) section II of insurances during the years 2004–2008 (total 100%)

Source: own work based on the author's research project concerning the Polish insurance market in the aspect of reinsurance during the years 2004–2008 (almost 70% of section II insurance market was covered).

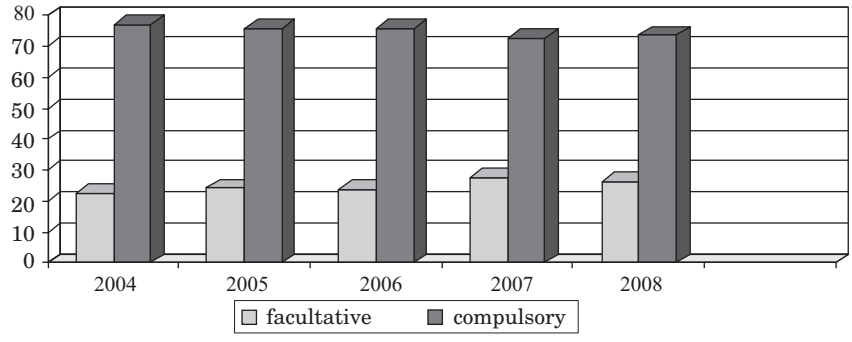

Fig. 2. Percentage share of premiums in facultative and compulsory reinsurance in group thirteen (general third party insurance) section II of insurances during the years 2004–2008 (total 100%)

Source: own work based on the author's research project concerning the Polish insurance market in the aspect of reinsurance during the years 2004–2008 (almost 70% of section II insurance market was covered).

The final conclusions from the conducted own studies on applied types of reinsurance in group thirteen (general third party insurances) of section II of insurances during the years 2004–2008 after covering almost 70% of that section insurance market can be formulated as follows:

1. Compulsory (around 70% of the market) and proportional (around 91% during the years 2004–2006 and around 80% during the years 2007–2008) was the dominating type of reinsurance applied by insurance companies,
2. Among proportional reinsurance methods the amount reinsurance only was applied (this means that surplus reinsurance and mixed reinsurance were not applied),
3. Among non-proportional reinsurance methods the facultative reinsurance of damage surplus and compulsory reinsurance of damage surplus per event only were applied,
4. Non-proportional reinsurance of loss burden surplus was not applied,
5. The balance of reinsurance operations was always negative.

Conclusion

The studies conducted so far indicate that during the years 2004–2008, in group thirteen (general third party insurance not included in groups from ten through twelve) of section II insurances, the insurance companies applied mainly the proportional reinsurance (ca. 91% of the market), however, during the years 2007–2008 that share decreased to ca. 80% to the benefit of non-proportional reinsurance. This indicates that the insurers increasingly

often opt for coverage against consequences of high damages or high concentration of performance of ordinary (normal) risks during a given period, that is, in the here discussed case, the risks concerning general third party insurance. As a consequence of the fact that non-proportional reinsurance is provided mainly by professional reinsurers – as there is a big problem with determining the premium adequate to the risk – and faced with absence of domestic professional reinsurance companies, the entire reinsurance premium for those contracts goes to the foreign professional reinsurers. This is not a favorable situation from the perspective of the country's balance of trade, the more so as a consequence of the fact that the balance of reinsurance operations in the discussed groups of insurances was always negative, which means that insurance companies always transferred more funds (part of premium) to reinsurers than they received in the form of participation of those reinsurers in the damages and benefits disbursed. Considering on the other hand the other structure of reinsurance, that is facultative and compulsory reinsurance the compulsory reinsurance dominated with ca. 75% share in the market. This means that the assigners (insurance companies) prefer contracts made in advance (in that case reinsurance is of automatic character) and for a specific time, and as a consequence of the fact that settlements are of periodic type the work intensity of servicing such contracts decreases. In case of that type of contracts that usually cover large volumes of risks of different types, the assigner may expect higher commissions and higher share in the reinsurer's profit so there is a better chance of decreasing the usually negative balance of reinsurance operations by insurance companies.

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AGRICULTURAL INSURANCES IN THE MACROREGION OF NORTHERN POLAND

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K e y w o r d s: production risks in agriculture, compulsory and voluntary insurances in agriculture, family farms, diagnose for the region of northern Poland.

A b s t r a c t

The studies aimed at formulating the diagnose of agricultural insurances in family farms of northern Poland. The choice of farms for the study was performed by applying the random-strata sampling system. For the confidence level of 0,95 the minimum number of farms for the study was 384. The questionnaire-based study encompassed 420 family farms with the area exceeding 1 ha.

The studies indicate that 90% of the farms purchased the compulsory agricultural insurance. The average year cost of crops insurance per farm amounted over PLN 300, farm buildings PLN 280 and farmer's third party liability PLN 70. More than a half of the farmers declared that the average burden for the farms. Voluntary insurance was less popular. Only about 20% of farm owners purchased them. The farmers covered only 7,6% of the area under crops with the voluntary insurance and the costs of such insurance averaged just around PLN 100. The study also found a clear, directly proportional relation between the farm area and the level of the farm insurance.

UBEZPIECZENIA ROLNE W MAKROREGIONIE PÓŁNOCNEJ POLSKI

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S ł o w a k l u c z o w e: ryzyka produkcyjne w rolnictwie, ubezpieczenia obowiązkowe i dobrowolne w rolnictwie, gospodarstwa indywidualne, diagnoza regionu północnej Polski.

A b s t r a k t

Celem badań była diagnoza stanu ubezpieczeń rolnych w gospodarstwach indywidualnych północnej Polski. Gospodarstwa do badań wybrano systemem losowo-warstwowym. Dla poziomu ufności 0,95 minimalna liczba gospodarstw do badań wyniosła 384. Zankietowano 420 gospodarstw rolników indywidualnych o powierzchni powyżej 1 ha.

Z badań wynika, że 90% gospodarstw wykupywało obowiązkowe ubezpieczenia rolne. Przeciętny roczny koszt ubezpieczenia upraw w gospodarstwie wynosił ponad 300 zł, budynków rolniczych 280 zł, a OC rolnika 70 zł. Ponad połowa rolników uznała to za średnie obciążenie dla gospodarstw. Mniej popularne były ubezpieczenia dobrowolne. Zaledwie około 20% właścicieli gospodarstw je wykupiło. Dobrowolnym ubezpieczeniem rolnicy asekurują tylko 7,6% posiadanej powierzchni upraw, a koszt ich ubezpieczenia wynosi niespełna 100 zł na gospodarstwo. W badaniach stwierdzono wyraźną wprost proporcjonalną zależność między powierzchnią gospodarstwa a poziomem ubezpieczenia w gospodarstwie.

Introduction

Insurance is the condition for stabilization of the farm and the farming as a whole. That is why farming without an efficient system of insurance, well designed and adjusted to the actual needs, but also without the capacity of the farmers, may not develop appropriately, may not satisfy the market expectations, may not modernize and improve (STROIŃSKI 2006 p.5).

According to the model established in Poland, the business activity insurances can be divided into two groups: compulsory insurances and voluntary insurances.

Compulsory (obligatory) insurances are those that the farmer is required to purchase by the law. According to the legislator, imposing the statutory requirement on farmers to purchase insurance aims at protection of possible victims against the consequences of lack of insurance. It is characteristic for the compulsory insurances that heir scope is defined by the law and the scope of coverage cannot be narrowed discretionally, no additional exclusions can be made, etc. The currently effective law in Poland imposes on the farmers the duty to contract three types of insurance:

Third party liability insurance related to possession of a farm called the OC of the farmers. The Act on compulsory insurances, Insurance Guaranty Fund and Polish Motor Insurers' Bureau, Dz.U. of 2003, No. 124, item. 1152.

The third party liability insurances protect not only the person responsible for damages against expenditures exceeding its financial capability but also the victim against long and arduous actions related to claims for damages against the guilty party. Article 44 Of the Act on compulsory insurances. imposes on the farmers the duty of contracting third party liability insurance related to possession of a farm. According to the provisions of the Act, the farmer, that is the entity, required to contract the insurance coverage is a person in possession or joint possession of which the farm is. It is worth highlighting that also the tenant, lessee and user of the farm is required to contract that insurance.

The notion of the farm, according to the legislator encompasses the agricultural land, land under ponds and land classified as agricultural under buildings and structures exceeding the total area of 1 hectare if it is, as a whole or in part, subject to taxation with the agricultural tax (Act on agricultural tax, Dz.U. of 1984, No. 52, item 268). The farm is also the area of land, indifferent of its area, if it is used for agricultural production that represents the special segment of agriculture (greenhouse production and production in heated foil tunnels, cultivation of fungi and mycelium, in vitro cultivation, farm breeding and rearing of fur and laboratory animals, rearing of earthworms, rearing of entomofags, rearing of silkworms, apiculture as well as breeding and rearing of other animals outside a farm) according to the regulations on the personal income tax.

Insurance of farm buildings and structures against fire and other disasters referred to as the insurance of agricultural buildings; The Act on compulsory insurances, Insurance Guaranty Fund and Polish Motor Insurers' Bureau, Dz. U. of 2003, No. 124, item. 1152.

According to the Act, the farmer is required to make the insurance contract of any farm building against fire and other disasters. The farm building should be understood as any structure that is and object permanently fixed to the ground, separated from space by means of partitions and possessing foundations and roof, exceeding 20 square meters in area if it forms a part of the farm. The duty to insure the building is established as of the date of roofing the building. According to article 69 of the Act on compulsory insurance... the insurance of the farm buildings provides damages in case of disasters in he form of a fire, hurricane, flood, partial flooding, torrential rain, hale, snowfall, thunder strike, explosion, landslide, bounce, avalanche or fall of an aircraft.

Insurance of at least 50% of the field crops area in the farm against the risk of damages caused by flood, drought, hale, negative consequences of wintering and spring frost (compulsory crops insurance). Act of the 7th of March 2007 on amendment to the Act on subsidies to the insurance of farm crops and livestock and some other Acts. Dz.U. No. 9, item 328.

A farmer who obtained direct subsidies to agricultural land (according to the regulations on subsidies to agricultural land and separate sugar payment) is required to insure at least 50% of the area under crops. The compulsory insurances cover crops of cereals, corn, field beans, rape, hops, tobacco, field vegetables, fruit trees and bushes, strawberries, potatoes sugar beets or leguminous crops, from sowing or planting until harvest. Those crops, however, are covered by the insurance against certain risks of damages such as flood, drought, hale, negative consequences of wintering and spring frost.

Voluntary insurance, the purchase of which is discretional, are purchased not as required by the law but on discretional contract between the insured and the insurance company. The voluntary insurance may cover the mobile property, livestock, agricultural machines and the remaining part of crops. Voluntary insurances cover material damages (agricultural equipment, materials, stocks, household mobile goods, livestock and crops) protecting the owner against the loss incurred as a consequence of a disaster.

Insurance companies present an extensive offer of insurance products protecting almost all species and groups of livestock, crops, agricultural machinery or accumulated agricultural products and other mobile goods. All those products can be divided into several basic groups of voluntary insurances in agriculture:

– **insurance of mobile property at farms**

Mobile farm property insurances offered by insurance companies cover:

– household mobile property – equipment, furniture and household stocks, clothing, electronic equipment, works of arts, permanent elements of home equipment such as floors, built-in furniture, heating systems, water and sewers installations, windows and doors;

– goods related to operation of the farm or a special segment of agricultural production: agricultural machines and equipment, construction materials, fuels, fertilizers, fodders, plants protection products, packages, office equipment;

– livestock;

– agricultural products stored,

This is an excellent comprehensive complement to the compulsory insurance of farm buildings, which is a typical insurance of the walls'' protecting the structure of the buildings covered only.

– **insurance of farm machinery**

The voluntary agricultural insurance can cover agricultural equipment, which means the machines, including harvesting machines and other mobile machines, tools and equipment for farm operation, excluding agricultural tractors and trailers. The agricultural equipment does not include the other vehicles that are subject to compulsory registration in the country. As a consequence cars and trucks, motorcycles and mopeds, their additional equipment and parts, even if they are used by the farmer, are not agricultural equipment. Those vehicles are covered by the third party liability insurance of vehicles compulsory for all drivers. They may also be insured additionally within the frameworks of full coverage auto-casco insurance.

– **insurance of crops**

As already mentioned, the farmer who obtained direct subsidies to agricultural (according to the regulations on subsidies to agricultural land and

separate sugar payment) is required to insure at least 50% of the area under crops, however, those crops are covered against some risks of damages caused by flood, drought, hale, negative consequences of wintering and spring frost only. The other risks are excluded from the coverage by the compulsory insurance. Also the farmers not benefiting from direct subsidies to land are not covered by the requirement to insure their crops. That group may, voluntarily, opt for insuring their crops to the extent and against the risks of their choice. The insurance of crops may cover crops or/and their harvests, one year sown or planted to ground (spring crops), winter crops, multiyear and permanent crops or/and their harvests, crops of hops, tobacco, herbs in the technical process of curing, grasses of meadows and pastures, fruit trees and bushes and plantations of berries. Crops can be covered against the risk of fire, hurricane, flood, torrential rain, hale, thunder explosion, landslide, avalanche, drought, negative consequences of wintering and spring frost.

– **insurance of livestock**

The law does not require farmers to insure the livestock to any extent of coverage. They may do that voluntarily according to one of the two modes of risk coverage: basic – damages caused as a consequence of death resulting from disease, accident or disaster (fire, flood, hurricane, thunder, avalanche, landslide) or extended covering the earlier mentioned risks resulting from slaughter out of necessity. In the insurance application the farmer declares that the insured livestock is healthy and with no defects. In some cases the insurance company may require presentation of the veterinary opinion confirming the welfare of the animals.

Materials and methodology

The studies aimed at formulating the diagnose of agricultural insurances in family farms of northern Poland. The studies covered family farms from 3 voivodships of northern Poland: Warmińsko-Mazurskie, Pomorskie and Kujawsko-Pomorskie. There are around 213,600 farms exceeding 1 ha representing the total area of around 2,890,000 ha in the above-indicated voivodships (GUS 2008).

The farms for the study were selected according to the random-strata sampling method. The voivodships were divided into counties and counties into municipalities. In the municipalities farms for the study were drawn at random to obtain the sample proportionally to the population. The farms covered originated from every municipality and every county of the 3 voivodships covered in the macroregion of northern Poland. The sample population was estimated for large populations at the minimum level equal to:

$$n = \frac{u_\alpha{}^2}{4d^2}$$

n – necessary minimum sample population
$u_\alpha{}^2$ – number of standard deviation units that should be read from the table of normal distribution for the confidence level of 1-α
d – error or maximum difference between the fraction from the sample and fraction of the population that we want to assume at the chosen confidence level.

The minimum population of farms for the study at the confidence level of = 0,95 is:

$$n = \frac{1.96^2}{4 \cdot 0.05^2} = 384 \text{ at the significance level } \alpha = 0{,}05\%.$$

Actually, the questionnaire-based study covered 420 farms at the end of 2009 during the period of October-December. The sample structure was determined on the base of the farms population structure in the macroregion. The typology of the population was maintained.

The questionnaire consisting of 23 questions, mainly semi-open ones with a menu of several answers but not exhausting all the possibilities offering the opportunity to the respondent to present opinions and own comments was the research tool. The respondents were personally served the questionnaires that were completed in the presence of the interviewer, which facilitated clarifying possible doubts to the respondent agricultural producers.

The questions concerned, among others:

– typology of farms covered: area, production type, number of household members, main sources of support for the family, etc.

– motivating factors influencing insurance policy purchase,

– level and type of compulsory and voluntary insurances purchased by farmers,

– risks covered by crops insurances purchased,

– financial burden related to compulsory and voluntary insurance in farmingą

The source material collected was subject to comparative analysis and it was presented in graphic, tabulation and descriptive formats.

Characteristics of the farms covered

The study covered family farms with the area exceeding 1 ha. The farms were divided into the following area groups: 1.01 – 5 ha; 5.01 – 10 ha; 10.01 – 20 ha; 20.01 – 30 ha; 30.01 – 50 ha and over 50 ha. The respondents possessing farms of 1.01 – 5 ha had the highest share (39,2%) in the population covered. Farms of 10 to 20 ha represented ca. 20%, 5 to 10 ha and over 50 ha – 12.5%. The smallest numbers of farms belonged to the groups of 20–30 ha – 7.5% and 30–50 ha – 9.2%. In the farms covered the average area of arable land was 18 ha, and permanent green land 4.5 ha. A more detailed characteristic of the farms is presented in table 1. The major production specializations were cereals (40.2%) and live pigs (15.2%).

Table 1

Characteristics of farms covered

Item	Farms	
	number	share (%)
1. Types of production in covered farms		
– cereals	169	40.2
– mixed	84	19.8
– live pigs	64	15.2
– dairy	54	12.9
– other	50	11.9
2. Main source of family support		
– farm income	253	60.2
– work outside agriculture	137	32.6
– pension, disability pension	26	6.2
– other	4	1.0
3. Number of household members		
– up to 2	88	21.0
– 3–4	225	53.6
– 5–7	100	23.8
– 8 and more	7	1.7
4. Education of farm owner		
– elementary	39	9.3
– vocational	152	36.2
– secondary	168	40.0
– tertiary	61	14.5

Source: own work based on the studies conducted.

Around 20% of the farmers indicated at least two responses, which means multidirectional production at their farms. In most cases that was cereals plus live pigs. In case of the response "other" indicated by 12% of the respondents, vegetables and rape as well as rearing of horses and poultry were the most frequent answers.

For over 60% of the farmers covered the farm income was the main source of support. The larger the area of the farm the higher share of such responses was with over 90% of responses among the farmers possessing farms of more than 50 ha and only about 25% in case of the owners of the smallest farms. Around 1/3 of the owners of the farms covered supported themselves on work outside the farm and over 6% of the farmers have pension or disability pension for the basic source of support. The living standard is also determined by the family size in the farmer's household. Most frequently the family consists of 3–4 persons (53.6% of the respondents). In 21% of the farms 2 or just 1 person works. This might indicate the decrease in the number of farms in the near future. There are very few families consisting of 8 or more persons. This indicates that the model of the rural family is nearing that of the urban family. The share of families with many children is very low (1.7%), while still several years ago such families formed the majority among rural families.

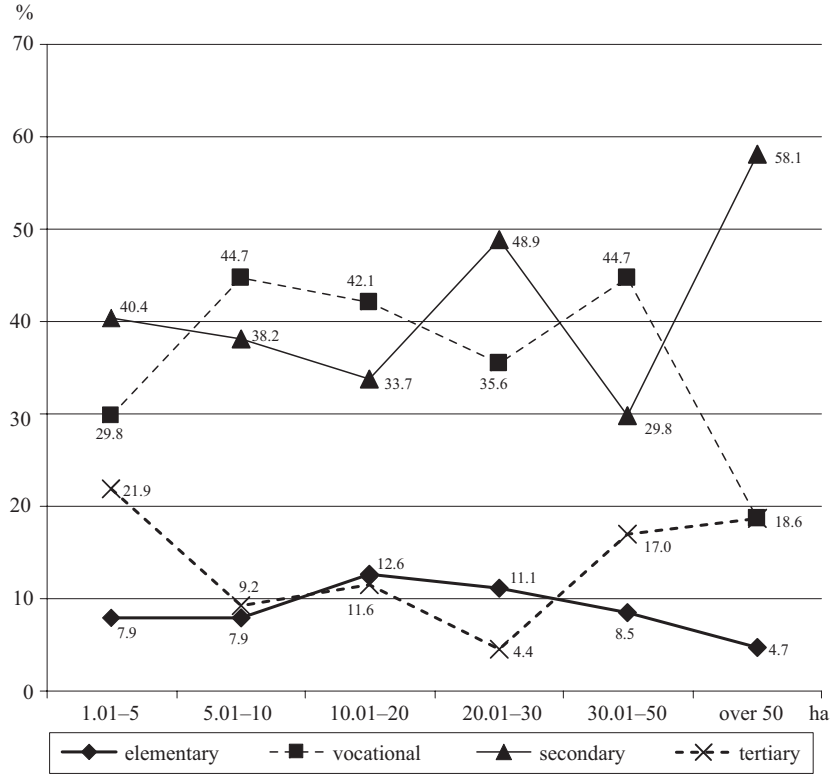

Fig. 1. Farmers' education and farms' area

Source: own work based on the studies conducted.

Education level of farm owners represents an important aspect, to a large extent determining success in business, which farming currently is. In the rural areas of Poland slightly more than a half of the population has education higher than elementary, in urban areas it is more than 3/4 of the adult population. Also the percentage of people with no education in rural areas is 3 times higher than in the urban areas. Respondent farmers, in their majority, possessed vocational and secondary education (over 3/4 of the population covered). Only 14.5% of them possessed tertiary education while 9.3% just elementary education. As indicated by the study, certain correlations between the level of farmer's education and the size of the farm operated could be noticed (Fig. 1).

Among the farmers with tertiary education the two largest groups are farmers possessing farms of up to 5 ha who treat them as recreation objects and support themselves on full time jobs, in most cases in towns, and farmers possessing farms of over 50 ha who support themselves on incomes from own farm only. At the farms of over 50 ha the share of farmers with secondary and tertiary education is the highest. Those two groups together represent over 3/4 of the owners of the largest farms. The largest proportion of farmers with vocational and elementary education works at farms of 5 to 20 ha in area.

Coverage with agricultural insurances in the macroregion of northern Poland

Prevalence of the individual types of agricultural insurance was diversified. Around 89% of the farms covered purchased the compulsory insurances. Only farmers from the area group exceeding 50 ha, who were able to identify the risk and economic benefits of decisions taken purchased it 100%. Despite penal sanctions, as much as 11% of the covered farmers' population did not purchase compulsory insurances giving excessive costs and difficulties with obtaining damages as the reasons while 1/3 of them did not fear the risks (Fig. 2).

In the population covered, 80% of farm owners insured farm buildings, 77% purchased third party liability insurance and 38% the compulsory insurance of crops (Fig. 3). The insurance of buildings is the most frequently selected compulsory insurance product. As the farmers point out, it is not the fear of penalty for not possessing that insurance that plays the decisive role but the risk and possible large losses in property as well as the fact that the insurance also covers the residential buildings. 23% of farmers did not purchase the third party liability insurance. Educated people and those with long work experience in agriculture most frequently purchase that coverage. Many farmers do not understand the nature of that insurance and not all are aware what risks can

be involved in the profession of a farmer and what harm can be done to third parties.

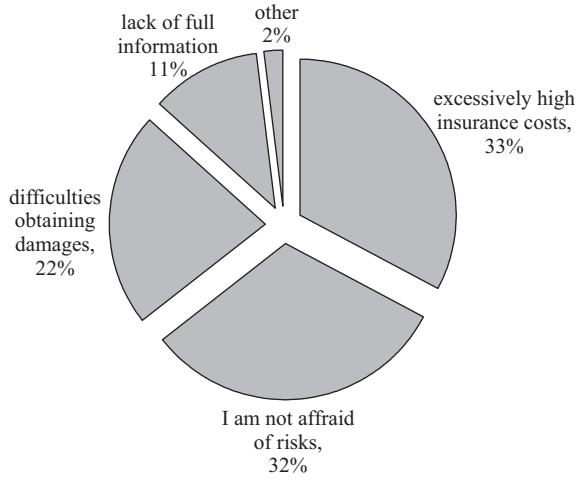

Fig. 2. If you do not use compulsory insurances, then why?
Source: own work based on the studies conducted.

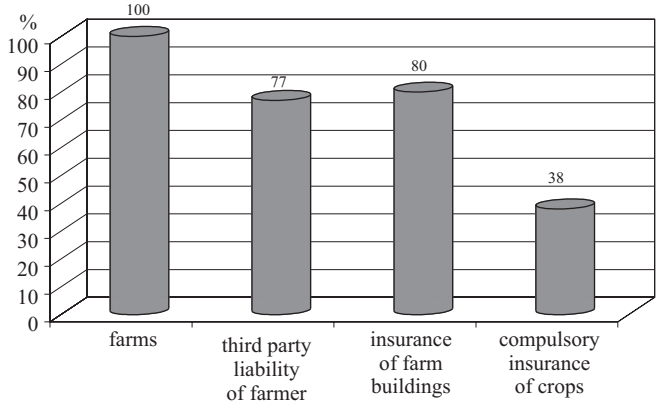

Fig. 3. Level of compulsory insurances purchased by farms covered
Source: own work based on the studies conducted.

It seems that the low level of coverage with the compulsory insurance of crops results from still low proliferation of knowledge on the subject among farmers, in particular owners of small farms. That is confirmed by the information in Figure 4.

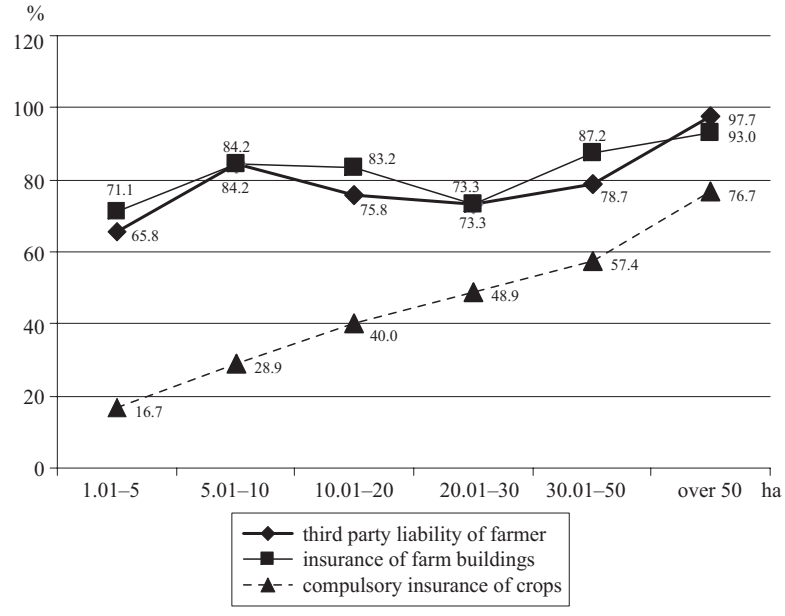

Fig. 4. Farm area and insurance coverage
Source: own work based on the studies conducted.

An obvious correlation can be noticed between the farm size and the insurance level. With the increase of the farm area the number of farmers purchasing insurance coverage increases. This is particularly well visible in case of the compulsory insurance of crops. Almost 77% of farmers possessing farms exceeding 50 ha in area purchase that coverage while in the group of the owners of the smallest farms (up to 5 ha) that coverage is just 17%

The proportions of the individual risks in compulsory insurance are diversified (Fig. 5).

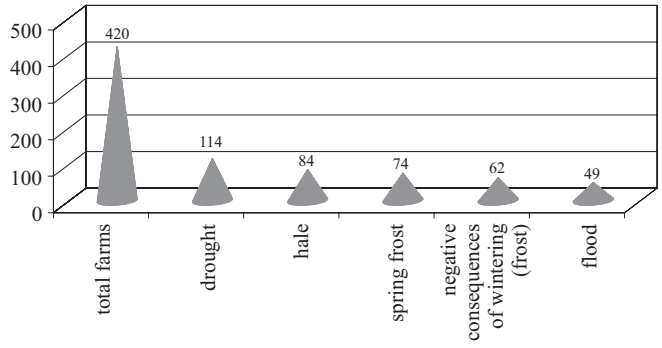

Fig. 5. Risks in the compulsory agricultural insurances purchased
Source: own work based on the studies conducted.

As much as 1/4 of the farms possessing crops coverage insured them against drought, 1/5 against hale and 1/6 against spring frost. Also the responses to the question concerning the major threats for the farms covered indicate the same rankings concerning natural risks for their farms (Fig. 6).

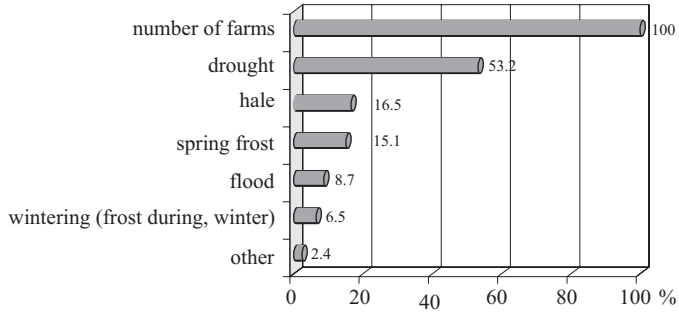

Fig. 6. Which risks to crops you consider the most dangerous at your farm?
Source: own work based on the studies conducted.

The farmers fear drought the most (53% of responses), which is followed by hale and spring frosts.

The costs of compulsory insurances were diversified. The average year cost for insurance of crops was PLN 300, insurance of farm buildings PLN 280 and the third party liability PLN 70 (Fig. 7).

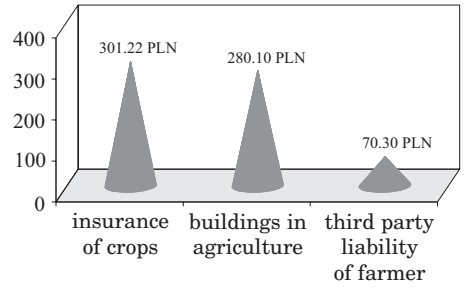

Fig. 7. Amount of year premiums of individual compulsory insurances per 1 farm covered
Source: own work based on the studies conducted.

More than a half of the farmers considers that cost a moderate burden to the farm while 17.7% a large one (Fig. 8).

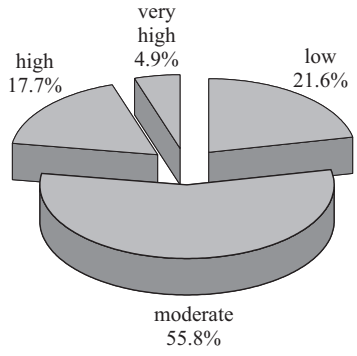

Fig. 8. Burden, according to farmers, with year compulsory insurance
Source: own work based on the studies conducted.

The fact that 22% of farmers considered the burden with compulsory insurances to be small and only 5% a very high can be a surprise.

The basic reasons that made farmers purchase the compulsory insurance were satisfying the imposed statutory duty (57% of responses) and fear for the future of the farm (39.5%) (Fig. 9).

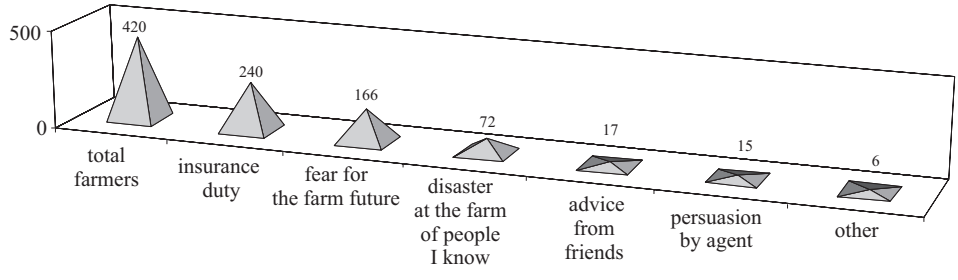

Fig. 9. Motivations for purchasing the compulsory agricultural insurance
Source: own work based on the studies conducted.

As concerns the group of voluntary insurances, the farmers purchased movable property insurance (38.5%) and agricultural machines insurance (28.3%) most frequently. Insurances of field crops and livestock were purchased by 16% of farmers covered each (Fig. 10).

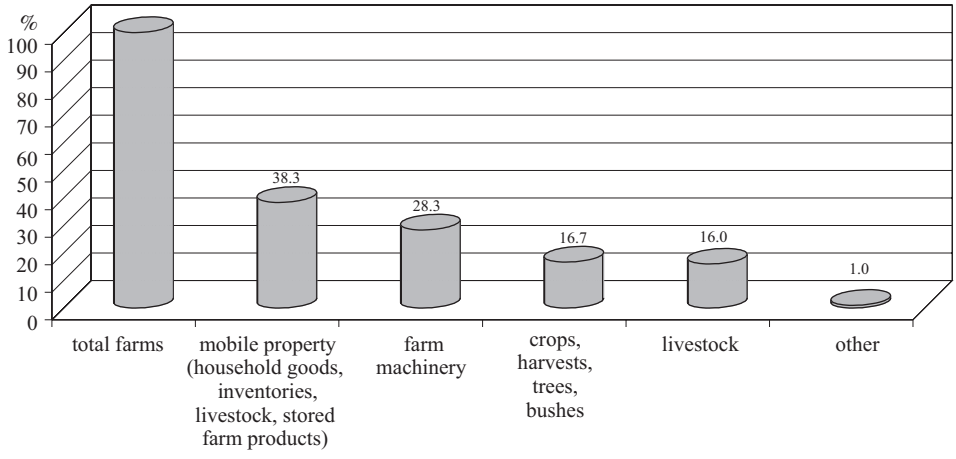

Fig. 10. Voluntary insurances used in the farm
Source: own work based on the studies conducted.

Cereals and rape were the most frequently insured crops. The average area of crops insured was 5.76 ha covered by the compulsory insurances and 1.7 ha by the voluntary insurances per farm (Tab. 2).

Table 2

Insurance of field crops in the population covered

Item	Farms covered	Insurance of crops	
		compulsory	voluntary
Number of farms – total – with the insurance purchased	420	156	63
Area under crops [ha/farm] – total – insured	22.5	5.76	1.70
Percent of area under crops insured [%]	x	25.6	7.6
Cost of the insurance of crops [PLN/farm]	x	301.22	92.43

Source: own work based on the studies conducted.

Insurances in the farms covered by the study covered: compulsory insurances – around 1/4 of the area under crops and voluntary insurances only around 7.6% of that area while their costs were under PLN 100 per farm. Frequently they were insurances providing coverage against just one risk.

Summary and conclusions

Among the farmers covered the owners of farms with the area of 1.01 – 5 ha (39.2%) and 10–20 ha (ca. 20%) were the two largest groups. The major production areas were production of cereals (for 40.2% of farms) and live pigs (for 15.2%). For over 60% of farmers covered the farm income was the major source of income. The larger the size of the farm the higher was the percentage of such responses. Around 1/3 of the owners of farms covered supported themselves on work outside the farm. Most frequently, the farmer household consisted of 3–4 persons (53.6%). In 21% of the farms only 2 people or just one person worked while only 1.7% of farmer families consisted of 8 and more people. The majority of the responding farmers possessed vocational or secondary education (over 3/4 of the population studied). Only 14.5% possessed tertiary education while 9.3% elementary education.

Among the farms covered, as much as 11% of the owners did not purchase any compulsory insurance specifying high costs (33% of responses) and difficulties in obtaining damages (22%) as the reasons for the situation and 1/3 of them did not fear any risk. Around 80% of the farmers insured the buildings while 77% purchased the third party liability insurance of the farmer and 38% the compulsory insurance of crops. The average year cost of the insurance of crops was PLN 300, insurance of agricultural buildings PLN 280, and third party liability insurance PLN 70.

In the group of voluntary insurances the farmers purchased most frequently the insurance of the mobile property (38.5%) and agricultural machines (28.3%). The insurances of crops and livestock were purchased by around 16% of farmers covered each. The most frequently insured crops were the cereals and rape. As many as 1/4 of the farms covered their crops against drought, 1/5 against hale and 1/6 against spring frost in the insurance of crops. The farmers indicated the same ranking of risks to their crops in responses to the questions concerning the major risks to their field crops.

The clear correlation between the farm size and insurance coverage was noticed. With the increase in the farm area the number of farmers purchasing insurances increases. The average area of the insured crops was 5.76 ha covered by the compulsory insurance and 1.7 ha by the voluntary insurance per farm, which represents 25.6% and 7.6% of area coverage with insurance respectively.

The coverage of crops and livestock is particularly inadequate. Farmers expect introduction of systemic solutions appropriate for individual lines of agricultural production and State aid (also financial) in that area.

Translated by JERZY GOZDEK

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Ustawa o zmianie ustawy o ubezpieczenia upraw rolnych i zwierząt gospodarskich oraz ustawy o krajowym systemie ewidencji producentów, ewidencji gospodarstw rolnych oraz ewidencji wniosków o przyznanie płatności, Dz.U. z 2008 r., nr 145, poz. 918.

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EVALUATION OF THE EFFECTS OF FINANCIAL STATEMENT CONVERSION ACCORDING TO THE INTERNATIONAL ACCOUNTING STANDARDS ON THE BASIS OF A SELECTED COMPANY

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K e y w o r d s: International Accounting Standards, financial statement.

A b s t r a c t

The changes taking place both in societies as well as in the world's economy, resulting from the increase of the international business and cultural exchange, caused the necessity of harmonization in the area of broadly defined business accounting.

Financial statements are crucial in the context of making decisions on investment, development and strategies, as well as, for perception of the company by outside users of these reports. Striving at the solid presentation of information based on economic events registered by the company requires a good knowledge of the accounting rules. Accounting rules used in financial reporting play an important role in the evaluation of financial performance of a company.

The problem of converting the financial statements prepared according to the Polish accounting law into the statements based on the principles of the International Financial Reporting Standards (IFRS) is widely described in the literature. However, there is a deficiency in studies presenting the effects of converting financial reports prepared according to the Polish accounting law into the statements based on the principles of the International Accounting Standards in the context of evaluation of the company's financial resources, assets, and income.

The goal of this paper was to indicate the areas and extent of discrepancy of the financial report prepared according to the Polish balance law and that consistent with the International Financial Reporting Standards, as well as to evaluate the impact of the changes on the balance structure, income statement and basic financial ratios.

The results of the study prove that the differences between the Polish balance law and the International Accounting Standards (IAS) concerning the presentation of financial reports had a significant impact on the evaluation of financial situation of the company examined and the usefulness of financial reports for the readers as well as the quality of decisions.

OCENA SKUTKÓW PRZEKSZTAŁCENIA SPRAWOZDANIA FINANSOWEGO WEDŁUG WYMOGÓW MIĘDZYNARODOWYCH STANDARDÓW RACHUNKOWOŚCI NA PRZYKŁADZIE WYBRANEJ SPÓŁKI

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S ł o w a k l u c z o w e: Międzynarodowe Standardy Rachunkowości, sprawozdanie finansowe.

A b s t r a k t

Zmiany zachodzące w społeczeństwach oraz gospodarce światowej, wynikające ze wzrostu międzynarodowej wymiany handlowej i kulturowej, spowodowały także konieczność harmonizacji w szeroko rozumianej sferze rachunkowości podmiotów gospodarczych.

Sprawozdania finansowe mają duże znaczenie w podejmowaniu decyzji inwestycyjnych, rozwojowych, strategicznych, a także postrzeganiu spółek przez użytkowników zewnętrznych, odbiorców tych sprawozdań. Dążenie do rzetelnej prezentacji informacji na podstawie zdarzeń gospodarczych zarejestrowanych przez spółkę wymaga dobrej znajomości przepisów rachunkowości. Stosowane przepisy podczas sporządzania sprawozdań finansowych odgrywają także istotną rolę w ocenie sytuacji finansowej stosującego je podmiotu.

W literaturze problem przekształcania sprawozdań finansowych sporządzanych według polskiego prawa bilansowego na zasady Międzynarodowych Standardów Sprawozdawczości Finansowej (MSSF) jest szeroko opisywany. Brakuje jednak opracowań prezentujących skutki przekształcenia sprawozdania finansowego sporządzonego na podstawie polskiego prawa bilansowego na zgodne z Międzynarodowymi Standardami Rachunkowości (MSR) z punktu widzenia oceny sytuacji finansowej, majątkowej i wyniku finansowego danej spółki.

Głównym celem artykułu było wskazanie obszarów i stopnia rozbieżności sprawozdania finansowego, sporządzonego według polskiego prawa bilansowego oraz sprawozdania finansowego zgodnego z Międzynarodowymi Standardami Sprawozdawczości Finansowej, a także ocena wpływu zmian na strukturę bilansu i rachunku zysków i strat.

Wyniki przeprowadzonych badań wskazują, że różnice występujące między polskim prawem bilansowym a międzynarodowymi standardami rachunkowości w zakresie prezentacji sprawozdań finansowych miały istotny wpływ na ocenę sytuacji finansowej badanego podmiotu, a w konsekwencji użyteczność dla czytelników sprawozdania finansowego i jakość podejmowanych decyzji.

Introduction

Globalisation process occurring in various areas of economies, politics and culture has not bypassed the areas of business entities accounting either. It was started already during the 19th c. and is still characterised by the developmental trend (GMYTRASIEWICZ 2000, JARUGA 1998, WALIŃSKA 2005).

In the developed market economy characterised by existence of the capital market and free flow of capital, accounting gains major importance. Its task is to provide reliable and honest information on the results of business activities and financial standing of the individual business entities (MESSNER 2007).

Existence of differences in principles of drafting financial statements between individual countries causes that they are not compatible in the global or European markets (WALIŃSKA et al. 2006).

Financial statements are of major importance for taking investment, development, tactical and strategic decisions and as a consequence it is an important issue that they should be prepared according to the same principles by different business entities, which would allow, e.g. taking optimal decisions by the investors from different countries. On the 27th of August 2004, the Sejm [Parliament] of the Republic of Poland, amending the Act on accounting, introduced the possibility (and later a duty for some companies) to apply the International Financial Reporting Standards (IFRS). In that way, many subsidiaries of other companies – issuers of securities allowed for public trading preparing consolidated financial statements according to the International Accounting Standards (IAS) – obtained the possibility of applying the International Financial Reporting Standards (IFRS) (at least statistically in case the owners – bodies approving the financial statement – did not pass the resolution on transition to the IAS).

The problem of converting the financial statements prepared according to the Polish accounting law into the statements based on the principles of the International Financial Reporting Standards (IFRS) is widely described in the literature (HELIN 2006, JARUGA 2004, OSTASZEWICZ 2004, *Przewodnik*... 2006). However, there is a deficiency in studies presenting the effects of converting financial statements prepared according to the Polish accounting law into the statements based on the principles of the International Accounting Standards in the context of evaluation of the company's financial standing, assets and financial result.

The main objective of the paper is to define the areas of differences resulting from the Polish accounting law and the International Financial Reporting Standards and evaluation of the influence of IAS principles on the financial statements (balance sheet and profit and loss account structure), and, as a consequence, evaluation of the financial standing of the company.

Considering the extensiveness of the International Financial Reporting Standards, the paper focused only on those accounting standards that were applicable to the company studied. This resulted from the specific characteristics of the operation of the entity studied that is rental of real property to own account.

Research material and methodology

The research was based on the data of a joint stock company that is a subsidiary of a company the shares of which are publicly traded. The basic

business of the company is rental of real property to own account. As a consequence of the change in regulations concerning preparation of consolidated financial statements by publicly traded companies the studied company transformed its financial statement as at 31.12.2004 for the purpose of group consolidation according to the International Financial Reporting Standards (IFRS), assuming the date of 01.01.2004 as the date of transition to the IFRS. Company financial statements, i.e. the balance sheet and profit and loss account were the main source of information used in this paper. The financial data for 2004 represents the subject of the study. The additional research material includes the financial statements as at 31.12.2003, helpful in determining the opening balance as at the date of transition to the International Financial Reporting Standards as well as other internal documents of the company influencing appropriate representation of economic transactions.

The method of analysis of comparisons concerning two consecutive years and versions of the balance sheet and profit and loss account prepared according to the different standards using tabulations was applied for processing the material collected.

Research result

Transformation of the financial statement prepared according to the Polish accounting law into one that is consistent with the IAS involves several stages. During stage one the differences in booking and valuation of assets and liabilities according to the IAS and the Act on accounting must be identified. Next, the IAS accounting standards and their interpretation as at the financial statement date must be identified. The IFRS 1 require the entity to observe every IAS effective as at the date of the first financial statement made according to the IAS. The next stage involves determination of the date of transition to the IAS, the reporting sate, reporting period and compatible reporting period. Next the scope of applying the optional derogations concerning retrospective application of standards must be determined. Determination of the opening balance sheet as at the transition date to the IAS is another, relatively complex, stage. It involves:

– including all the assets and liabilities as required by the IAS, which in practical terms may lead to including such items that according to the Act on accounting were not included in the records or had a zero value,

– removing the items of assets and liabilities that are not allowed by the IAS,

– changing the classification of items represented according to the earlier applied principles of accounting to different categories of assets or liabilities.

– applying the IAS to valuation and presentation of all assets and liabilities included.

Determination of the reporting items as at the date ending the compatible period (balance sheet, statement of changes in capitals, profit and loss account, cash flow) is included in the next stage. Finally, reconciliation between the previously applied principles of accounting and the IAS as at the transition date and as at the end of the period presented in the last year financial statement made according to the previously applied principles of accounting is done.

The data concerning the identified differences between the values in the financial statement (balance sheet and profit and loss account) are presented in tables 1-3.

Data presented in tables 1 and 2 indicate that there were changes in the balance sheet after application of the International Financial Reporting Standards. The balance sheet footing as at 31.12.2004 decreased by 15,7% and many changes were made in presentation of the individual balance sheet elements.

In case of the subject company the transformations on the assets side concerned fixed assets only. The differences appeared in both the intangible and legal assets value and the tangible fixed assets. The necessity to translate the land perpetual usufruct rights to the non-balance sheet records and representing operational lease according to the IAS 17 "Leasing" were the main reason for the changes. On the other hand the fixed assets as well as intangible and legal assets fully depreciated, according to the IAS 16 "Tangible fixed assets" and the IAS 38 "Intangible assets" were valued according to the fair values (buildings) and revaluated values (computer software) and included in the balance sheet. This resulted from the fact that the company was in possession of fixed assets used that according to the balance sheet had been depreciated during the earlier years. Additionally, changes in the assets caused changes in the assets for the deferred taxes.

In addition to elimination of the land perpetual usufruct rights, also the deduction updating the value of assets according to the IAS 36 "Loss of assets value", performing the permanent loss of value test, was necessary to represent the value of assets in the balance sheet as at 01.01.2004. The IAS 36 requires that the regained value of an item of assets or cash generating centre (e.g. a set of components of assets is such a centre) should be determined as the higher of: the fair value decreased by the costs of sale or utility value. In case of the subject company the deduction updating the value of assets as at 01.01.2004 was determined at PLN 266,400 decreasing the value of assets to the level of net sale price according to the initial real property sales contracts made as at that date.

Table 1

Assets of the studied company according to the Act on accounting and the IFRS

Assets according to the Act on accounting	31 Dec. 2004	31 Dec. 2003	Assets according to the IFRS	31 Dec. 2004	31 Dec. 2003
	K PLN	K PLN		K PLN	K PLN
A. Fixed assets	15.936,3	25.919,5	A. Fixed assets	12.145,7	18.286,6
I. Intangible and legal fixed assets	0,0	0,0	I. Intangible and legal fixed assets	0,0	9,4
II. Tangible fixed assets	15.899,2	25.636,7	II. Tangible fixed assets	38,4	17.943,8
III. Long-term receivables	0,0	0,0	III. Real property as investments	0,0	0,0
IV. Long-term investments	37,2	37,2	IV. Fixed assets for sale	12.070,1	0,0
V. Long-term prepayments	0,0	245,6	V. Long-term receivables	0,00	0,00
			VI. Investments in units	37,2	37,2
			VII. Deferred tax assets	0,00	296,2
B. Current assets	8.243,5	11.138,2	B. Current assets	8.243,5	11.138,2
I. Inventories	6,7	15,4	I. Inventories	6,7	15,4
II. Short-term receivables	5.423,8	7.881,4	II. Receivables for deliveries and goods and other	5.423,8	7.881,4
III. Short-term investments	2.808,5	3.237,4	III. Financial assets for trade	0,0	0,0
IV. Short-term prepayments	4,5	4,0	IV. Cash and equivalent	2.808,5	3.237,4
			V. Short-term prepayments	4,5	4,0
Total assets	24.179,9	37.057,7	Total assets	20.389,2	29.424,8

Source: own work based on the financial statements of the studied company.

Table 2

Liabilities of the studied company according to the Act on accounting and the IFRS

Liabilities according to the Act on accounting	31 Dec. 2004	31 Dec. 2003	Liabilities according to the IFRS	31 Dec. 2004	31 Dec. 2003
	K PLN	K PLN		K PLN	K PLN
A. Equity capital, including:	18.161,5	30.574,1	A. Equity capital, including:	18.511,3	27.269,5
VIII. Net profit (loss)	(3.051,3)	4.835,5	VI. Net profit (loss)	(863,4)	1.289,4
B. Liabilities and provisions for liabilities	6.018,3	6.483,6	B. Liabilities and provisions for liabilities	1.877,9	2.155,3
I. Provisions for liabilities	598,6	476,6	I. Long-term liabilities	206,4	301,8
II. Long-term liabilities	0,0	0,0	II. Short-term liabilities	1.671,5	1.853,5
III. Short-term liabilities	1.355,5	1.397,4			
IV. Accruals	4.064,2	4.609,5			
Total liabilities	24.179,9	37.057,7	Total liabilities and capital	20.389,2	29.424,8

Source: own work based on the financial statements of the studied company.

Table 3

Profit and loss account of the studied company according to the Act on accounting and the IFRS

Profit and loss account according to the Act on accounting	31 Dec. 2004	31 Dec. 2003	Profit and loss account according to the IFRS	31 Dec. 2004	31 Dec. 2003
	K PLN	K PLN		K PLN	K PLN
A. Net sales revenues and equivalent, including:	6.050,6	10.068,9	A. Net sales revenues and equivalent, including:	6.050,7	10.069,0
B. Operating costs	6.612,4	10.717,3	B. Operating costs	6.441,4	10.574,3
C. Profit (loss) on sales (A-B)	(561,7)	(648,4)	C. Profit (loss) on sales (A-B)	(390,7)	(505,3)
D. Other operating revenue	3.013,8	12.177,9	D. Other revenues	2.125,5	9.392,4
E. Other operating costs	5.173,7	1.778,8	E. Other costs	2.071,3	1.800,6
F. Operating profit (loss) (C+D-E)	(2.721,6)	9.750,7	F. Operating profit (loss) (C+D-E)	(336,5)	7.086,5
G. Financial income	211,6	881,3	G. Financial costs	8,9	3.447,8
H. Financial costs	8,9	3.447,8	H. Gross profit (loss) (F-G)	(345,4)	3.638,7
I. Profit (loss) on economic activity (F+G-H)	(2.518,9)	7.184,2	I. Income tax	518,0	2.349,3
J. Result of extraordinary items (J.I.-J.II.)	(0,6)	13,5	J. Net profit (loss) (H-I)	(863,4)	1.289,4
K. Gross profit (loss) (I+J)	(2.519,5)	7.197,7			
L. Income tax	531,8	2.362,2			
M. Net profit (loss) (K-L)	(3.051,3)	4.835,5			

Source: financial statements of the subject company.

Additionally, the assets were adjusted by the net value of fixed assets sold and the amount of depreciation for 2003. The adjusted net value decreased the value of assets while the depreciation influenced that value in the opposite way.

As a consequence of the correlation between the IAS 36 and IFRS 5 "Fixed assets for sale and ceased activities" the order of applying those two standards is important. As at the balance sheet date, i.e. 31.12.2004, the company applied IFRS 5, which was reflected in the balance sheet while the additional assets were decreased by costs related to sale of assets.

As indicated by table 2, changes occurred in both the equity, where an increase by 1.9% occurred, and in the liabilities. The change representing the largest value occurred in the net profit (loss), which decreased by ca. 3.5 times as compared to the profit measured according to the Polish accounting law. In that item the results of assets valuation and adjustments for updating deductions were accumulated.

Increase in long-term liabilities resulted from reclassification of accruals. The perpetual usufruct rights were removed from that item and the presentation of other prepayments was changed by classifying them to liabilities.

Data presented in table 2 indicate that short-term liabilities according to the IFRS were increased by the cash received for the conditional real property sale contracts made (according to the regulations of the Act on accounting those amounts would represent prepayments).

One of the fundamental principles of IAS 18 "Revenues" is that revenues and costs concerning the same transaction should be represented in parallel. As a consequence, one cannot present revenues if we do not have the reliably defined amount of transaction costs. If the seller, then, received payment (on the base of the conditional contract) it represents the liability to the buyer until the amount of costs related to that transaction is defined in a reliable way.

As indicated by table 2, the accruals were adjusted by the following titles:

– according to the IAS 17 "Leasing" the value of land perpetual usufruct rights at PLN 3,925,800 did not satisfy the criterion of including it in the balance sheet and it was transferred to non-balance sheet records (treated as operational leasing),

– the surplus over the book value of the object of financial lease was included in the year of making the lease contract and increased the result of the past years,

– additionally, amounts received from conditional contracts made, according to IAS 18, "Revenues" were included in short-term liabilities.

Transformation of the statement influenced both the revenues and the costs of the company, which resulted in decreasing the net loss for 2004

(tab. 3). Total revenues determined according to the IAS 18 were lower than the revenues determined according to the Polish accounting law by ca. 12%. This was caused by the change in valuation of the fixed assets sold where the profit from sale of fixed assets in 2004 according to the Polish accounting law was achieved at book values, which were not subject to revaluation. Revenues according to the IFRS were adjusted (decreased) also by a part of the surplus achieved resulting from leasing. Depreciation, which reflected the period of use of assets by the company (before transformation of the statements depreciation was determined according to the tax rates) also influenced the level of costs measured according to the Polish accounting law. Additionally, as of December 2004, depreciation of fixed assets transferred to the fixed assets for sale was ceased.

The data presented in table 3 indicate that the other costs according to the IFRS were decreased by 60% as compared to the costs measured according to the Polish regulations, which resulted from reverting the deductions for permanent loss of value of fixed assets that were established according to the Polish regulations. After valuation of assets according to the IFRS the deduction decreased only the capital from valuation update. According to the IFRS the estimated costs related to disposal of fixed assets, which according to the Polish regulations decreased the capital from valuation update were included in the costs.

Summary and conclusions

The progressing process of economy globalisation determines the need for harmonisation of accounting. The global trends and solutions applied in accounting in other countries are also visible in the Polish accounting law, which is exemplified by numerous amendments to the Act on accounting.

Transformation of the financial statement into one that is consistent with the international accounting standards requires a lot of work. There are still, despite implementation into the Polish accounting law of the solutions consistent with the international accounting standards, numerous areas where the IAS and Polish accounting regulations differ.

The problem of financial statements transformation is currently described extensively in the literature. This results from the fact that there are differences of opinions on interpretation and application of the International Financial Reporting Standards.

The results of the conducted studies allow formulation of the following conclusions:

1. As a result of application of the IFRS, the values of total assets and total liabilities decreased by ca. 16%. That resulted mainly from removing the land

perpetual usufruct rights from the balance sheet and valuation of assets according to the fair value.

2. After application of the principles of accounting of the IFRS the increase of the share of equity in the sources of financing the assets of the studied companies by 15% occurred. This was caused mainly by the decrease of the total liabilities. The changes in the structure of liabilities were influenced mainly by accruals, which before transformation represented 16.8% of total liabilities and after application of the IFRS their share was zero. That was the consequence of removing the land perpetual usufruct rights from the balance sheet and transformation of accruals into liabilities according to the IFRS.

3. Transformations made in the profit and loss account caused that the financial result of the company after changes of regulations according to the IFRS was improved significantly. Before the transformation the net loss amounted PLN 3,051,300 and after application of the IFRS the loss was decreased to PLN 863,400, i.e. by around 2/3 of the initial value. In case of the studied company, first of all, the profit resulting from sales of assets, deductions for permanent loss of value of assets and costs of depreciation were represented in more realistic way after applying the depreciation rates considering benefits for the company from using the individual groups of assets. As a consequence, the consequences resulting from the real value of assets were not achieved during the current year on sale of the assets, as was the case according to the Polish accounting rules, but were included in the retained profits or capital from valuation update.

Concluding, the differences between the Polish accounting law and the International Financial Reporting Standards have a significant influence on the balance sheet structure and, as a consequence, suitability of the financial statement for the users and quality of decisions taken. Nevertheless it should be noticed that there are areas where application of the IFRS did not result in appearance of differences. The current assets should be mentioned here first of all. The valuation of those components was the same according to the Polish accounting law and the IFRS.

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CLASSIFICATION OF OBJECTS ON THE BASE OF THE EXPECTED INFORMATION VALUE

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K e y w o r d s: classification of structures, similarity of structures, expected value of information.

A b s t r a c t

In this paper applying the expected information value for determining the degree of dissimilarity of structures was proposed. The methodology proposed represents one of numerous attempts at employing the measures defined on the grounds of the information theory for investigating socio-economic phenomena. The expected value of information on transformation of the observed structure into another structure compared with it may be treated as the starting point in the central agglomeration procedure. The paper presents the hierarchic classification by means of full linking of counties in Warmińsko-Mazurskie voivodship according to the similarity of the structure of economic entities according to the PKD (Polish Classification of Business Activities) sections so that the possibility of employing the expected information value in the classification procedures was presented.

KLASYFIKACJA OBIEKTÓW NA PODSTAWIE WARTOŚCI OCZEKIWANEJ INFORMACJI

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S ł o w a k l u c z o w e: klasyfikacja struktur, podobieństwo struktur, wartość oczekiwana informacji.

A b s t r a k t

W artykule zaproponowano wykorzystanie wartości oczekiwanej informacji do określania stopnia niepodobieństwa struktur. Zaproponowana metoda jest jedną z wielu prób wykorzystania miar zdefiniowanych na gruncie teorii informacji do badania zjawisk społeczno-ekonomicznych. Wartość oczekiwana informacji o transformacji obserwowanej struktury w inną, porównywaną z nią struk-

turą, można potraktować jako punkt wyjścia w centralnej procedurze aglomeracyjnej. Przeprowadzono klasyfikację hierarchiczną metodą pełnego wiązania powiatów województwa warmińsko-mazurskiego za względu na podobieństwo struktur podmiotów gospodarczych wg sekcji PKD, a zatem wskazano na możliwość wykorzystania wartości oczekiwanej informacji w procedurach klasyfikacyjnych.

Introduction

The increase in complexity of socio-economic phenomena contributes continually to the development of statistical methods used for investigating those phenomena. Classification procedures represent a rich group of tools used in socio-economic studies. In the methodology of sciences it is assumed that classification is the first objective among the fundamental objectives of a science being at the same time a tool and goal of cognition. The issues of classification have long been the subject of interest in numerous scientific disciplines and in modern science the development of classification methods was initially associated with biology. During the early 20th C., in natural sciences digital classification methods have been employed, which gave the beginning to the development of taxonomic methods. With the passage of years further classification procedures have been and still are developed that found applications in various disciplines of the knowledge. Polish scientists, starting with the outstanding anthropologist, demographer and statistician Jan Czekanowski, through the creators of the original taxonomic method (dendrite method) with Florek and Steinhaus as the leaders up to the works by Hellwig from the turn of the nineteen sixties and seventies, contributed significantly to the development of taxonomic methods. As concerns the new proposals, the taxonomy of structures proposed by Sokołowski (CHOMĄTOWSKI, SOKOŁOWSKI 1978), or the proposal for imparting of dynamism of the taxonomical methods presented by Grabiński (GRABIŃSKI 1984) should be mentioned. The consecutive years have brought a number of works concerning applications of taxonomical methods in socio-economic research. They included the proposals for applying the measures defined on the grounds of the information theory in the taxonomical procedures (WĘDROWSKA, ZAPOTOCZNA 2004, ROESKE-SŁOMKA 2008, CHEN, WANG 2008).

In this paper the methodology of objects classification on the base of the expected information value on structures characterizing the objects classified. The goal of the study was to show that the expected information value is the measure of dissimilarity of structures as a consequence of which it can be employed in taxonomical algorithms. The proposed methodology represents one of many attempts at implementation of methods and models defined on the grounds of the information theory in studies on socio-economic phenomena. The measures of the information theory found application, among others, in dynamic modeling or in the multidimensional data analysis.

Structure information expected value

In case of socio-economic issues the degree of similarity or dissimilarity of structures characterizing objects frequently is the subject of studies. In this paper, according to (*Taksonomia...* 1998). A structure will be interpreted as an object described by o vector of structure (or share) indicators. Determination of the S^n vector is justified only when the characteristic X that is the subject of study satisfies the property of additivity that is when the sum of values of the individual variants of that characteristic make economic sense.

The indicators of structure or indicators of share that are respectively the component of the structure S^n satisfy the following conditions:

(1) Normalizability: $0 \leq \alpha \leq 1$ (i= 1,...,n),

(2) Unit-sum condition: $\sum_{i=1}^{n} \alpha_i = 1$ (i = 1,...,n).

Investigation of changes and similarity between structures may be of statistical or dynamic character and as a consequence the analysis may cover the similarity of structures in an ndimensional space or testing the variability of structures over time.

We will consider the object of classification that is a countable, consisting of m-elements, set **O** of objects O_i, characterized by n-dimensional structures S_i^n. The criteria for division of the set of objects will be based on the function assigning to every pair of objects O_i, $O_j \in$ **O** the measure of mutual dissimilarity of structures S_i, S_j characterizing those objects. The criteria of classification are the functional defined on the set of all possible subsets G_1,..., G_p (where $p \leq m$) of the set **O** and defining the homogeneity of the individual subsets that are the effect of grouping and the degree of heterogeneity between the identified groups. The subsets G_1,..., G_p that result from the division should satisfy the conditions of:

(1) separability ($G_i \cap G_j = \emptyset$; $i \neq j$; i, j= 1,...,p),

(2) completeness $\bigcup_{i=1}^{p} G_i = \mathbf{O}$.

Choice of the appropriate measure of the distance (or similarity) between the classified structures is the starting point for the majority of taxonomical procedures. The choice of the measure with which the degree of similarity of structures in multidimensional space is determined is of major influence on the results of grouping or organizing (*Statystyczne metody...* 1999). Usually the measures of similarity of structures fulfill the function of the measures of the distance of their partial indicators. Because of the specificity of the problems of similarity of structures, that issue was a subject of numerous works. The

review of the major methods for measurement of similarity of structures was presented by MŁODAK (2006).

In this paper the measure defined on the grounds of the theory of information will be proposed that could be employed for determining the degree of dissimilarity of structures. In the paper by (THEIL 1979) the expected quantity of information contained in the message on transformation of the probabilities p_i ($i = 1,2,...,n$) into probabilities q_i for n mutually excluding events E_1, E_2,..., E_n is considered. Using that concept in the investigation of structures the quantity of information on the degree of dissimilarity of structures S_i^n. and S_j^n. can be determined. Let's the structure S_i^n. be expressed by the vector of structure (or share) indicators $[\alpha_i^1, \alpha_i^2,..., \alpha_i^n]$, and structure S_j^n. by the vector of indicators $[\alpha_j^1, \alpha_j^2,..., \alpha_j^n]$ satisfying the conditions of normalization and unit sum. The expected quantity of information about transformation of the structure S_i^n. treated as the base one into the structure S_j^n. is given by the formula:

$$I(S_j^n : S_i^n.) = \sum \alpha_i^k \log \frac{\alpha_j^k}{\alpha_i^k} \tag{1}$$

The expected value of information given by the formula (1) satisfies the following properties:

(a) $I(S_j^n : S_i^n) = 0$, if $\forall\ k = 1,2,...,n\ \alpha_i^k = \alpha_j^k$;

(b) $\alpha_i^k \log \frac{\alpha_j^k}{\alpha_i^k} > 0$ for $\alpha_i^k < \alpha_j^k$;

(c) $\alpha_i^k \log \frac{\alpha_j^k}{\alpha_i^k} < 0$ for $\alpha_i^k > \alpha_j^k$;

(d) $I(S_j^n : S_i^n) > 0$, if $S_i^n \neq S_j^n$

The value $I(S_j^n : S_i^n)$ informs about the degree of transformation between the base structure S_i^n and the structure S_j^n, that is the degree of similarity or dissimilarity of structures S_i^n and S_j^n. According to property (a) the expected information value $I(S_j^n : S_i^n)$ assumes the value equal to zero for two identical structures $S_i^n = S_j^n$, that is the structures for which each corresponding indicator $\alpha_i^k = \alpha_j^k$ for every $k = 1,2,...,n$. With appearance of increasing differences between the structures S_i^n and S_j^n the expected information value $I(S_j^n : S_i^n)$ is positive (property (d)) and increases to the infinity.

Measure $I(S_j^n : S_i^n)$ does not satisfy the condition of symmetry, which means that for different structures S_i^n and S_j^n the situation: $I(S_j^n : S_i^n) \neq I(S_i^n : S_j^n)$ occurs. The measures used for testing the similarity of structures are the most often

the measures representing the function of the distance between indicators of structures, as a consequence of which they satisfy the property of symmetry. There are however a few approaches that consider measures of similarity of structures showing lack of symmetry. In the literature critical opinions concerning the measures not satisfying the condition of symmetry can be found (MŁODAK 2006), but in the opinion of the author, in the studies on the similarity of structures the situations exist in which it is useful to apply measures of hat type. The conditions in which we accept that transformation of the structure S_i^n into the structure S_j^n is not equivalent to the transformation of the structure S_j^n into the structure S_i^n, that is in the situations when we treat one of the structures as the base structure or when the cost or weight of transformation is important can be the example. Moreover, use of the value of the expected quantity of information can be useful for investigating transformations of structures according to the dynamic approach.

Classification of the counties of Warmińsko-Mazurskie voivodship according to the structure of economic entities according to the PKD sections

Counties and cities possessing the rights of counties in Warmińsko-Mazurskie voivodship characterized by the number of entities of the national economy according to the selected sections of the PKD as at the 31st of December 2007 are elements of the set **O**. The X characteristic, which is the number of entities of the national economy, consists of nine variants A_k ($k = 1,...,9$), resulting from belonging of those entities to the specific sections of the Polish Classification of Business Activities (PKD).

The aim of the study is to determine the degree of dissimilarity between the structures covered. One of the methods of such studies is the graphic method of presenting the multidimensional data using the so-called symbolic graphs. The solution allows presenting each structure in the form of a symbolic drawing through which similarity of structures or individual properties of the structures can be identified. The star graphs are an example of symbolic graphs drawing of which for each structure starts in point P, in which all the rays have their beginning while maintaining identical angles between them (*Statystyczne metody...* 1999). Each of the rays symbolizes one of the components of the structure vector and the length of the ray is proportional to the value of the k coordinate of the vector S_i^n ($k = 1,2,...,9$) (Fig. 1). The symbolic graph offers the possibility of the initial assessment of similarity of the structures investigated.

Table 1

Structure of the entities of the national economy registered with the REGON register according to the selected sections of the PKD in 2007 (status as at the 31st of December)

County	Structure	Agriculture, forestry, hunting	Industry	Construc-tion	Trade and repair services	Hotels and restaurants	Transport, wareho-using and communica-tion	Financial services	Services for real properties and companies	Others
Braniewski	1.	0.0704	0.0752	0.0691	0.2786	0.0305	0.0372	0.0335	0.2041	0.2014
Działdowski	2.	0.0431	0.0980	0.1538	0.3000	0.0192	0.0575	0.0311	0.1206	0.1767
Elbląski	3.	0.0741	0.1407	0.0859	0.2706	0.0307	0.0600	0.0226	0.2092	0.1061
Iławski	4.	0.0570	0.1139	0.1046	0.3065	0.0206	0.0718	0.0322	0.1216	0.1718
Nowomiejski	5.	0.0696	0.1284	0.1269	0.2739	0.0139	0.0487	0.0317	0.1025	0.2043
Ostródzki	6.	0.0523	0.0958	0.1140	0.2757	0.0265	0.0583	0.0390	0.1679	0.1704
m. Elbląg	7.	0.0091	0.0928	0.0800	0.2676	0.0280	0.0714	0.0425	0.2331	0.1754
Bartoszycki	8.	0.0520	0.0834	0.0958	0.3009	0.0261	0.0630	0.0551	0.1354	0.1883
Kętrzyński	9.	0.0354	0.0752	0.0863	0.2915	0.0243	0.0632	0.0512	0.1811	0.1917
Lidzbarski	10.	0.0402	0.0956	0.1038	0.2940	0.0268	0.0505	0.0414	0.1768	0.1710
Mrągowski	11.	0.0511	0.0863	0.1149	0.2838	0.0688	0.0714	0.0282	0.1453	0.1501
Nidzicki	12.	0.0674	0.0922	0.1347	0.2900	0.0277	0.0463	0.0311	0.1233	0.1873
Olsztyński	13.	0.0616	0.1000	0.1197	0.2658	0.0287	0.0652	0.0300	0.1590	0.1700
m. Olsztyn	14.	0.0077	0.0742	0.0944	0.2652	0.0196	0.0778	0.0459	0.2218	0.1934
Szczycieński	15.	0.0885	0.0946	0.1233	0.2903	0.0339	0.0669	0.0267	0.1297	0.1462
Ełcki	16.	0.0298	0.0680	0.1098	0.2999	0.0291	0.0872	0.0349	0.1530	0.1883
Giżycki	17.	0.0484	0.0815	0.0972	0.2816	0.0516	0.0553	0.0280	0.1744	0.1820
Gołdapski	18.	0.0984	0.1144	0.1238	0.2250	0.0207	0.0551	0.0268	0.1662	0.1695
Olecki	19.	0.0628	0.0859	0.1333	0.2840	0.0321	0.0635	0.0321	0.1542	0.1522
Piski	20.	0.0780	0.0794	0.1006	0.2845	0.0560	0.0610	0.0246	0.1454	0.1705
Węgorzewski	21.	0.0886	0.0744	0.0815	0.2626	0.0433	0.0427	0.0304	0.1611	0.2154

Source: Central Statistical Office, www.stat.gov.pl

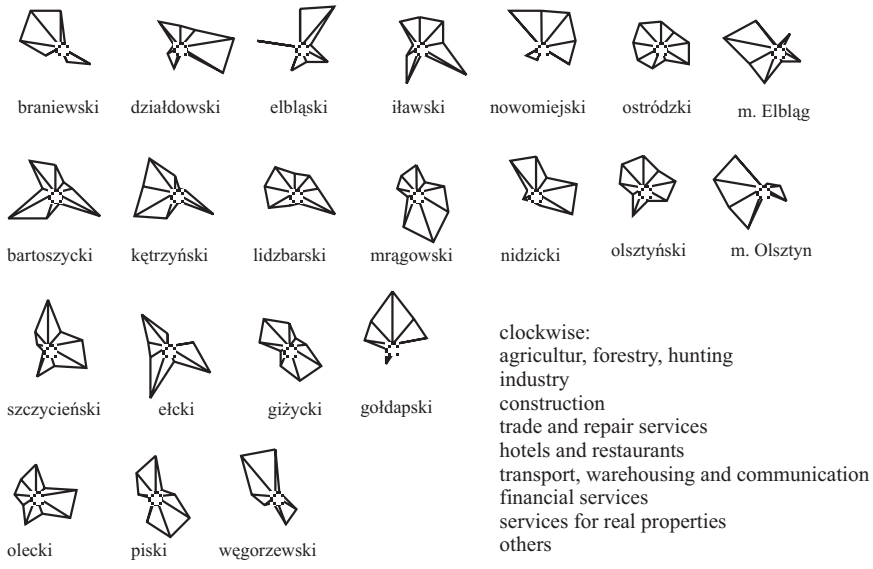

Fig. 1. Star graphs for the investigated structures
Source: own work using the STATISTICA software package

With the data on the structures S_i^9, S_j^9 (i, j = 1,2,...,21) available, the expected information values $I(S_j^n : S_i^n)$ were determined. In that way the asymmetric matrix of dissimilarities of values $I(S_j^n : S_i^n)$ assuming the structure with indicator i recorded in line i for the base structure (Tab. 2). As a consequence, the values recorded under the dissimilarities matrix diagonal are the values of information of the structure S_i^n into the structure S_j^n, where i is the indicator of the line corresponding to the structure S_i^n and j the indicator of the column corresponding to the structure S_j^n. With the increase in the degree of dissimilarity of structures the values of the expected quantity of information $I(S_j^n : S_i^n)$ increase. This confirms the hypothesis that the expected information value can be used for assessment of dissimilarity of structures. In case of the identical structures the measure $I(S_j^n : S_i^n)$ assumes the value of zero. Investigating the degree of dissimilarity of structures using the expected value of information on the transformation of structures may apply to transformations of dynamic character, i.e. where transformations of structures over time and dissimilarities of structures in statistical categories are observed, when the investigated structures are observed in an $n$multidimensional space.

The matrix of dissimilarities offers the starting point in the conducted clustering procedure. The structures describing the counties of Warmińsko-Mazurskie voivodship considering the entities of the national economy according to the PKD sections were classified according to the hierarchic method assuming the distance of the most distant neighborhood for the base. In the

method of the most distant neighborhood (complete connection, *complete-link*), the clusters were identified on the base of the highest expected information value $I(S_j^n : S_i^n)$ from among all the values for the structures belonging to the clusters connected. Two classifications were made where in the first one the expected information values recorded under the diagonal of the matrix of dissimilarities were considered so that the structure S_i^n. was treated as the base one. The values of $I(S_j^n : S_i^n)$ provide information on the transformation of the structure S_i^n into the structure S_j^n. The central agglomeration procedure was represented graphically in Figure 2 in the form of the dendrogram (tree of connections) indicating the order of connections between clusters. The hierarchy obtained allows presenting individual classes and structures contained in them.

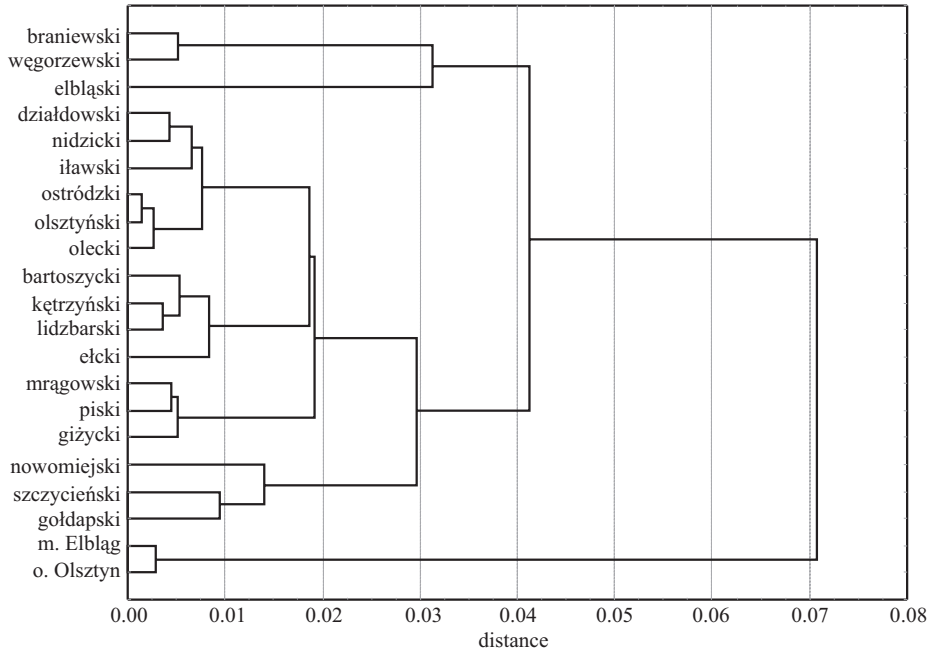

Fig. 2. Tree of connections in the hierarchic method with complete link on the base of the matrix of dissimilarities (expected information values from under the matrix diagonal)
Source: *own work using the STATISTICA software package.*

The selected hierarchic method belongs to the basic methods of classification. The following are listed as the major advantages of that method (*Statystyczna analiza...* 2009):

1. it functions according to one procedure,
2. the classification results are presented in the form of a sequence of classification, which allows controlling the classification process,
3. the classification results can be presented in the graphic form.

Table 2

Matrix of dissimilarity of structures

Counties	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.
1.	0.0000	0.0336	0.0261	0.0241	0.0318	0.0126	0.0274	0.0155	0.0116	0.0112	0.0276	0.0204	0.0159	0.0313	0.0245	0.0252	0.0099	0.0215	0.0198	0.0152	0.0052
2.	0.0317	0.0000	0.0366	0.0061	0.0086	0.0079	0.0390	0.0108	0.0180	0.0105	0.0225	0.0046	0.0078	0.0355	0.0133	0.0121	0.0190	0.0212	0.0072	0.0220	0.0294
3.	0.0267	0.0365	0.0000	0.0228	0.0378	0.0182	0.0364	0.0335	0.0328	0.0204	0.0256	0.0311	0.0164	0.0485	0.0186	0.0380	0.0229	0.0177	0.0189	0.0232	0.0330
4.	0.0239	0.0065	0.0237	0.0000	0.0070	0.0063	0.0357	0.0064	0.0146	0.0092	0.0191	0.0063	0.0052	0.0358	0.0077	0.0116	0.0158	0.0156	0.0074	0.0152	0.0212
5.	0.0333	0.0081	0.0389	0.0072	0.0000	0.0148	0.0575	0.0154	0.0287	0.0199	0.0378	0.0063	0.0126	0.0549	0.0147	0.0279	0.0304	0.0142	0.0164	0.0276	0.0261
6.	0.0117	0.0077	0.0175	0.0060	0.0137	0.0000	0.0200	0.0047	0.0058	0.0015	0.0130	0.0060	0.0013	0.0210	0.0093	0.0085	0.0062	0.0113	0.0027	0.0109	0.0139
7.	0.0437	0.0433	0.0546	0.0435	0.0685	0.0290	0.0000	0.0342	0.0146	0.0192	0.0428	0.0572	0.0391	0.0028	0.0727	0.0190	0.0284	0.0776	0.0444	0.0600	0.0667
8.	0.0153	0.0111	0.0321	0.0061	0.0152	0.0047	0.0271	0.0000	0.0049	0.0054	0.0171	0.0083	0.0074	0.0255	0.0132	0.0077	0.0105	0.0217	0.0084	0.0135	0.0147
9.	0.0120	0.0186	0.0327	0.0145	0.0289	0.0062	0.0114	0.0048	0.0000	0.0036	0.0221	0.0185	0.0116	0.0105	0.0262	0.0060	0.0095	0.0311	0.0140	0.0213	0.0204
10.	0.0114	0.0104	0.0203	0.0090	0.0189	0.0016	0.0147	0.0054	0.0035	0.0000	0.0157	0.0101	0.0053	0.0167	0.0167	0.0088	0.0062	0.0202	0.0068	0.0155	0.0179
11.	0.0248	0.0170	0.0250	0.0143	0.0284	0.0103	0.0331	0.0152	0.0192	0.0130	0.0000	0.0136	0.0087	0.0369	0.0104	0.0129	0.0052	0.0244	0.0069	0.0047	0.0191
12.	0.0197	0.0042	0.0308	0.0065	0.0060	0.0062	0.0438	0.0085	0.0179	0.0100	0.0162	0.0000	0.0050	0.0425	0.0059	0.0162	0.0122	0.0116	0.0047	0.0101	0.0129
13.	0.0143	0.0075	0.0158	0.0050	0.0114	0.0013	0.0263	0.0080	0.0111	0.0051	0.0108	0.0047	0.0000	0.0275	0.0051	0.0101	0.0067	0.0070	0.0016	0.0078	0.0126
14.	0.0502	0.0409	0.0702	0.0471	0.0707	0.0319	0.0029	0.0351	0.0148	0.0225	0.0516	0.0587	0.0429	0.0000	0.0789	0.0165	0.0350	0.0844	0.0472	0.0687	0.0739
15.	0.0238	0.0114	0.0198	0.0071	0.0140	0.0089	0.0474	0.0136	0.0239	0.0149	0.0109	0.0058	0.0050	0.0491	0.0000	0.0188	0.0135	0.0091	0.0035	0.0058	0.0156
16.	0.0245	0.0123	0.0413	0.0131	0.0296	0.0089	0.0178	0.0084	0.0059	0.0083	0.0153	0.0169	0.0115	0.0142	0.0236	0.0000	0.0102	0.0365	0.0115	0.0198	0.0278
17.	0.0093	0.0172	0.0226	0.0138	0.0254	0.0055	0.0207	0.0104	0.0089	0.0056	0.0052	0.0115	0.0063	0.0241	0.0141	0.0098	0.0000	0.0208	0.0074	0.0049	0.0093
18.	0.0197	0.0187	0.0167	0.0150	0.0131	0.0103	0.0442	0.0215	0.0267	0.0173	0.0279	0.0113	0.0065	0.0461	0.0094	0.0297	0.0206	0.0000	0.0104	0.0174	0.0159
19.	0.0178	0.0067	0.0191	0.0071	0.0157	0.0027	0.0308	0.0086	0.0131	0.0064	0.0084	0.0045	0.0016	0.0312	0.0036	0.0103	0.0075	0.0106	0.0000	0.0069	0.0154
20.	0.0144	0.0189	0.0235	0.0128	0.0225	0.0097	0.0393	0.0134	0.0190	0.0136	0.0045	0.0092	0.0070	0.0424	0.0055	0.0161	0.0045	0.0152	0.0066	0.0000	0.0066
21.	0.0052	0.0286	0.0312	0.0207	0.0243	0.0132	0.0401	0.0145	0.0174	0.0156	0.0189	0.0134	0.0128	0.0424	0.0157	0.0245	0.0083	0.0159	0.0157	0.0067	0.0000

Source: own computations.

In the hierarchic methods, the rule of clustering is not clearly determined. To solve that problem it is proposed to investigate the dendrogram as concerns the differences in the distance between the consecutive nodes (*Statystyczne metody*... 1999). Computing the threshold value determining the optimum concentration in hierarchic methods is also proposed. The proposal presented in the work (JABŁOŃSKI, ROBASZEK 2000), where the threshold value is the sum of the arithmetic average and two standard deviations from the minimum values obtained from all the columns is also a popular approach. In this paper that approach was assumed and the computed threshold value for all the expected information was 0.0109. The results of the first classification are presented in Table 3.

Table 3
Results of clustering using the hierarchic clustering procedure by means of complete linking method

Cluster	Counties belonging to the cluster
I	działdowski, nidzicki, iławski, olsztyński, ostródzki, olecki
II	bartoszycki, kętrzyński, lidzbarski, ełcki
III	mrągowski, piski, giżycki
IV	m. Elbląg, m. Olsztyn
V	braniewski, węgorzewski
VI	szczycieński, gołdapski
VII	nowomiejski
VIII	elbląski

Source: own work.

Each of the clusters contains the most uniform objects, i.e. counties of Warmińsko-Mazurskie voivodship similar in the structure of the entities of national economy according to the PKD sections. Such division coupled with the relatively low threshold value resulted in seven clusters with small populations. There are also single element clusters because there are structures that are dissimilar to the others. Such a division results from specific economic conditions in the counties covered.

On the base of the expected information values recorded above the diagonal of the matrix of dissimilarities the next classification was prepared. In that second classification the structure S_j^n. was treated as the base structure and the value $I(S_i^n : S_j^n)$ represented the quantity of information on the transformation of the S_j^n structure into the S_i^n structure. The central agglomeration procedure for that classification is presented graphically in figure 3 in the form of the tree of connections indicating the order of connections between clusters. The obtained hierarchy allows presenting individual clusters and structures con-

tained in them at the assumed, as previously, threshold value indicating the dissimilarity of structures at the level of 0.0109.

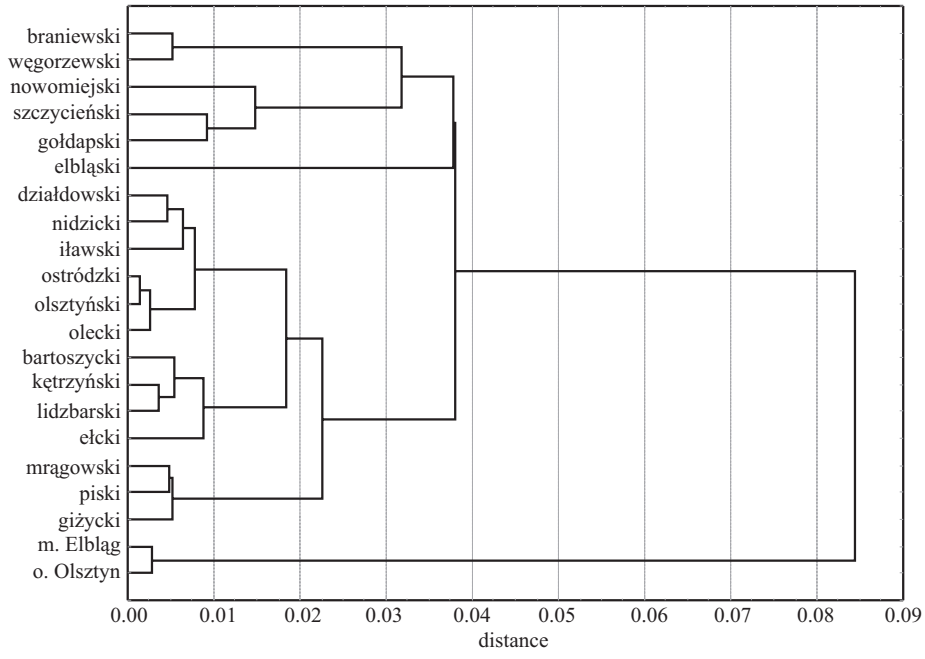

Fig. 3. Tree of connections in the hierarchic method with complete link on the base of the matrix of dissimilarities (expected information values from above the matrix diagonal)
Source: own work using the STATISTICA software package.

Both classifications were made according to the same methodology with the same central procedure and the same threshold value but based on the different expected information value. Despite the differences in the expected information values ($I(S_i^n : S_j^n) \neq I(S_j^n : S_i^n)$ for $S_i^n \neq S_j^n$) the same classification result, that is cluster of the same composition were obtained (Fig. 3). This means that the expected information value $I(S_j^n : S_i^n)$ can be treated as the measure of dissimilarity of structures and used as the starting point for the classification procedure despite not maintaining the property of symmetry by the measure proposed.

Conclusion

In the case of socio-economic issues there is a frequent need for identifying transformations of structures over time and assessment of similarity or

dissimilarity of structures of static nature. The paper presents the possibility of using the expected quantity of information on the transformation of the base structure S_j^n into the structure S_i^n for identification of the degree of dissimilarity of those structures. The methodology for assessment of the degree of dissimilarity of structures proposed in this paper may expand the set of taxonomical methods of multidimensional data analysis. Comparing structures from both the static and the dynamic perspective is not a new issue. The methodology for assessment of dissimilarity of structures proposed in this paper represents a modification of the measure defined on the grounds of the theory of information. The expected information value $I(S_j^n : S_i^n)$ may also be the starting point in the classification procedures and form the base for determination of the clusters of the most similar structures. The example of application of the methodology proposed presented in the paper indicates the possibility of employing the methodology presented in studies on socio-economic phenomena.

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KNOWLEDGE AND INNOVATION POTENTIAL: INTANGIBLE ECONOMIC RESOURCES IN THE NEW GLOBAL ECONOMY OF THE 21ST CENTURY*

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K e y w o r d s: knowledge, innovation, knowledge-based economy, economic resources.

A b s t r a c t

The aim of the paper is to present the changes in importance of the intangible economic factors such as knowledge and level of innovation in relation to the currently observed institutional transformation of the economic system, which leads to development of the "new global knowledge-based economy". The article attempts at confronting the theoretical considerations with the empirical data based on the aggregated data for the OECD countries. The paper makes use of the statistical materials collated by the Eurostat and OECD. The analyzed data may suggest that widely treated innovation represents one of the most important elements determining the economic potential.

WIEDZA I POTENCJAŁ INNOWACYJNY – NIEMATERIALNE ZASOBY EKONOMICZNE W NOWEJ GLOBALNEJ GOSPODARCE XXI WIEKU*

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S ł o w a k l u c z o w e: wiedza, innowacje, gospodarka oparta na wiedzy, zasoby gospodarcze.

A b s t r a k t

Celem artykułu jest ukazanie zmian znaczenia takich niematerialnych czynników gospodarczych, jak wiedza i poziom innowacyjności, w związku z obecnie dostrzegalną transformacją instytu-

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cjonalną systemu gospodarczego, która prowadzi do powstania „nowej globalnej gospodarki wiedzy". W artykule dokonano próby skonfrontowania rozważań o charakterze teoretycznym z danymi empirycznymi, bazując na danych zagregowanych dla krajów należących do OECD. W pracy tej wykorzystano materiał statystyczny gromadzony przez Eurostat oraz OECD. Przeanalizowane dane mogą sugerować, że szeroko traktowana innowacyjność stanowi jeden z najważniejszych elementów kształtujących potencjał gospodarczy.

Introduction

The last decades were characterized by the increasing importance of knowledge related to the quality of human capital and knowledge embedded in the products, which increasingly often loose their tangible, material form and intangible values, new ideas and solutions frequently referred to as the intellectual input become their core. It can be concluded with no doubts that the 20th C. was the first stage in the fundamental institutional, technological and social transformation, which resulted in revaluation of the so-called tangible factors of production and intangible resources, including mainly the knowledge (BALCERZAK, ROGALSKA 2008, pp. 71–89). Peter Drucker defined that transformation as the process of shifting from the industrial society to the post-capitalistic society, in case of which knowledge and effective use of the information become the main factor in increasing productivity. As a consequence, they represent the main resource in the wealth generation process, the main source of the comparative advantages and international competitiveness of the country (DRUCKER 1999, pp. 22–60, 148–156)[1]. Establishment of the "new global knowledge-based economy" in case of which information goods, digital goods become the key determining factor of innovation, production, level and quality of consumption, and by the same of the macroeconomic effectiveness is the consequence of that process.

This paper aims at presenting the changes in importance of intangible economic factors such as knowledge and innovation level in relation to the synthetically presented above institutional transformation of the economic system. Additionally, the paper presents an attempt at confronting the theoretical considerations with empirical data based on the aggregated data for the OECD member countries and the data presenting the global perspective.

[1] Also from the microeconomic perspective it should be highlighted that ignoring the increasing importance of knowledge and innovation as the key economic resource represents a direct threat to the existence of both global corporations and small and medium enterprises (see: Popławski 2004, pp. 27-39).

The nature of the new global knowledge-based economy

Assuming the Schumpeterian perspective, the new global knowledge-based economy should be treated as the global economy that is the effect of another wave of innovations, in this case the wave based on general use digital technologies (see: CARLSON 2004, pp. 245–264). Because of the fact that the diffusion of new general application technologies is the foundation for appearance of the new global knowledge-based economy, the process of its development encompasses a complex group of phenomena among which reorganization of economic entities, more effective and dynamic capital markets, increasing economic activity and dynamics of entrepreneurs, increasing variability of labor markets and irreversible globalization leading to continual and increasing national as well as international competition should be included (ATKINSON, CODURI 2002, pp. 2–4, LANDEFELD, FRAUMENI 2001, p. 23). It can be said, as a consequence that the new economy represents fundamental deviation from the national, corporate economy based on mass production of goods that dominated between the late 1940s and late 1970s. The new economy defined in that was is the global, knowledge and entrepreneurship based economy in which the extent to which the knowledge, technology and innovation are embedded in the products and services becomes the key success factor (ATKINSON, CORREA 2007, p. 3).

The new global knowledge-based economy is different from the "old" corporate economy existing from 1940s until 1970s in the same sense as the economy driven by technology changes in steel processing end electrification from the late 19th C. differed from the economy of the first half of the 19th C.[2] It is obvious that such evolution of the technological-economic system results in the institutional system transformation. This is reflected in and has significant implications for the economic role of the government, organization of business structures, labor market reality, legal system and finally the social and cultural changes (ATKINSON 2005, pp. 4–5). The most important differences between the so defined new global economy and the traditional industrial economy that dominated almost until the end of 1970s are presented in Table 1.

[2] Changes in production of cheap, high quality steel, development of machine industry and electrification process allowed development of the economy based on factory based production system able to make use of the effect of scale, which became an important determining factor in the process of oligopolyzation of the economy during the last decade of the 19th C. Those new economic structures of the late 19th C. differed diametrically from the structures dominated by small production companies focused on the local markets involved in free competition that dominated during from the beginning of the 19th C. (see: Mokyr 2001, pp. 9–14, Dawid 1990, pp. 355–361).

Table 1

Comparison of selected aspects of the new economy and industrial economy

Item	Industrial economy	New global knowledge-based economy
Macroeconomic environment characteristic		
Market	high stability	high variability
Scope of competition	national	global
Dominating organizational form	hierarchic, bureaucratic, linear	flat, network-based
Microeconomic perspective		
Production organization	mass production	flexible production system
Growth factors	investments in tangible capital labor	high innovation knowledge
Dominating technology	mechanization	digitalization
Sources of competitive advantages	decrease of costs resulting from using the effects of scale	innovation, quality, organizational innovation (*just-in-time, time-to-market*)
Importance of research and innovation	low or moderate	high
Dominating relations with other entities	independence	high level of cooperation, alliances, collaboration
Selected labor market characteristics		
Labor market policy goals	full employment	increasing the scope of labor use and increasing its productivity higher real wages and incomes
Skills	limitation and specialization	wide skills, multiaspect training
Education	skills, high importance of formal education	continuous education
Labor market regulation and labor management	conflict management	cooperation management
Character of employment	high stability	higher risk level larger importance of market opportunities
Government		
Government-business relations	imposing of regulations	creating conditions for growth
Regulations	governance and high level of operational control	market tools, promotion of flexibility

Source: own work based on: Atkinson, Correa (2007, pp. 3–12), Quah (2003, pp. 291–323), Black, Lynch (2003, pp. 546–565), Atkinson, Court (1998, p. 7), Hartman et al. (2001, p. XV).

The role of knowledge in the 21st C. economy

The Moore's Law, which should not be interpreted only in the categories of the exponential progress rate in computing capacity of computer hardware[3], but which also refers to the exponential growth of the knowledge generated by the humanity is one of the most important driving forces in the process of fundamental transformation leading to establishment of the new economy defined in the preceding subsection. Analyzing the human history during the last forty thousand years we can conclude that while initially the growth of knowledge and innovation was vary slow, in the 19th C. more inventions were reated than during all the preceding millennia together. During the 20th C. each consecutive generation created knowledge exceeding in its scope the knowledge that represented the accrued result of activities of all the earlier generations (BOEHLKE 2005, pp. 30–31).

The process finds empirical confirmation in that currently the developed economies as well as the majority of dynamically developing counties forced to make-up for the developmental gap, are dependent to an increasing extent on production of goods and services the core of which is the knowledge and intellectual property embedded in them[4]. Such products have already long ago crossed the border of the narrowly treated high technology business. Currently, in case of the majority of sectors, even in the so-called traditional sectors of economic activities, the manufacturing processes are not only capital intensive but, first of all, they require a large input of knowledge embedded in high quality human resources and the resources that in their nature represent intellectual property (SZABO 2002, pp. 25–47). Because of the increasing interrelations between business entities we can talk about the global dimension of that trend. As a result of those structural transformations, according to the OECD computations already during the mid-1990s the so-called knowledge-based sectors and knowledge generating sectors were responsible for generating over 50% of the GDP in the highly developed countries (OECD 1996, p. 9).

Knowledge and intangible outlays have always been an immanent element of the production process. However, in the realities of the traditional industrial economy, when economic activities of business entities focused on production

[3] Gordon Moore, the founder of the Intel Company noticed that the economically optimal number of transistors in the integrated circuit doubles every 18–24 months while the price level remains constant. That change translates into the exponential increase of the computing capacity of contemporary computers, which coupled with constant prices means a fast pace of decrease in the real cost of computing capacity.

[4] It is worth to notice, for example, the changes leading to the increase in importance of the knowledge based economy that have recently taken place in China (more see: Burrows et al. pp. 73–76).

of material goods knowledge was used mainly for increasing the effectiveness of the production process in which the tangible product was the final effect. Currently, on the other hand, knowledge is used for production of goods based on knowledge or information goods (see: DRUCKER 1999, pp. 25–47)[5]. And production of such goods, as different from production of physical goods, is characterized by constant or decreasing effects of scale, it is linked to the possibility of increasing effects of scale, network effects that may in fundamental way influence the mode of operation of the contemporary economy[6].

That new reality does not have to translate necessarily into macroeconomic benefits equally available to all the economies[7]. The level of competences of market entities adequate to the needs of the new technological reality is the marginal condition for making use of the potential embedded in that reality. It may be treated in a wide way as all the social institutions necessary for adaptation of the new generation technology (ELIASSON et al., 2004, pp. 289–293). Among the major institutional components we can list here the adequately high quality of generally available human resources and the effective national innovation system (see: OKOŃ-HORODYŃSKA 2002, pp. 18–25; FREEMAN 2001, p. 116; OKOŃ-HORODYŃSKA 1998b).

The general efficiency of the education system is an important element influencing the quality of human resources in a given country. Despite numerous controversies concerning the quality of education in individual countries we can now talk about a very high general level of formal education and focus on improvement of knowledge during the professional life almost in all the highly developed economies. This is confirmed by the empirical data collected in Table 2 presenting the percentage share of people with minimum upper secondary education in the population (columns 1 and 2), the expected length of the learning process (column 3) and the data concerning training for professionally active people (column 4) during the years 1995–2005.

Countries, in which in 2005 the share of people with minimum upper secondary education in the entire population was lower than 60% represented a marginal position. Those were Spain, Italy, Malta and Portugal. In the age group of 20–24 years that threshold could be moved even to 70% and it was not met by Spain, Portugal, Malta and Iceland only. On the other hand, comparing the values of those indicators for the years 1995, 2000 and 2005 we can talk about the increasing trend even in the countries possessing very high results

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[5] For example, Danny Quah lists, among others, widely understood knowledge, computer software, databases, products of the entertainment industry such as images, movies, computer games, various types of recipes, news, etc. as information goods of digital goods (Quah 2003, pp. 291–323).

[6] The issues related to microeconomic conditions of producing information products are widely analyzed by Hall Varian (see: 2001, p. 67; 2002, pp. 143–145).

[7] This was confirmed by the OECD empirical studies (see: 2004, 2002, 2001).

Table 2

Education and quality of human resources in selected countries during the years 1995–2005

Country	1			2			3			4		
	1995	2000	2005	1995	2000	2005	1998	2000	2005	1995	2000	2005
EU-27	–	64.4	69.3	–	76.6	77.4	–	16.7	17.6	–	7.1	9.7
EU-15	55.5	61	66.2	69.2	73.7	74.6	–	–	–	–	8	11.2
Euro zone countries	–	60	64.4	–	72.7	73.5	16.5	16.6	17.2	4.5	5.4	8.1
Belgium	54.5	58.5	66.1	77.6	81.7	81.8	–	18.6	16.5	2.8	6.2	8.3
Bulgaria	–	67.5	72.5	–	75.2	76.5	14.1	14.2	15.5	–	–	1.3
Czech Republic	–	86.1	89.9	–	91.2	91.2	15.1	15.6	17.1	–	–	5.6
Denmark	79.5	78.5	81	89.3	72.0	77.1	17.4	17.8	19.0	16.8	19.4	27.4
Germany	81.2	81.3	83.1	79.4	74.7	71.5	16.8	17.2	17.4	–	5.2	7.7
Estonia	–	86.1	89.1	–	79.0	82.6	15.4	16.8	18.5	–	6.5	5.9
Ireland	47.3	57.6	65.2	73.8	82.6	85.8	16.0	16.3	17.4	4.3	–	7.4
Greece	42.6	51.6	60	73.8	79.2	84.1	14.6	15.0	17.7	0.9	1	1.9
Spain	29.5	38.6	48.5	59.0	66.0	61.8	17.0	17.0	17.2	4.3	4.1	10.5
France	58.8	62.2	66.4	78.6	81.6	82.6	16.7	16.6	16.7	2.9	2.8	7
Italy	36.3	45.2	50.4	58.9	69.4	73.6	15.9	16.1	17.0	3.8	4.8	5.8
Cyprus	–	61.5	66.6	–	79.0	80.4	–	13.0	14.5	–	3.1	5.9
Latvia	–	83.2	84.5	–	76.5	79.9	14.3	15.5	17.9	–	–	7.9
Lithuania	–	84.2	87.6	–	78.9 i	87.8	14.4	15.8	18.0	–	2.8	6
Luxembourg	42.9	60.9	65.9	51.9	77.5	71.1	–	14.3	13.9	2.9	4.8	8.5
Hungary	–	69.4	76.4	–	83.5	83.4	15.4	16.1	17.7	–	2.9	3.9
Malta	–	18.1	25.3	–	40.9	53.7	–	14.4	15.3	–	4.5	5.3
The Netherlands	63.1[a]	66.1	71.8	67.6[a]	71.9	75.6	17.2	17.2	17.5	13.1	15.5	15.9
Austria	68.9	76.2	80.6	79.2	85.1	85.9	16.0	15.5	16.3	7.7	8.3	12.9
Poland	–	79.8	84.8	–	88.8	91.1	15.6	16.4	17.8	–	–	4.9
Portugal	21.9	19.4	26.5	45.1	43.2	49.0	16.6	16.9	16.9	3.3	3.4	4.1
Rumania	–	69.3	73.1	–	76.1	76.0	13.6	14.0	15.3	–	0.9	1.6
Slovenia	69.5[a]	75.3	80.3	84.4[a]	88.0	90.5	15.1	16.7	17.8	–	–	15.3
Slovakia	–	83.8	87.9	–	94.8	91.8	17.4	17.2	15.9	–	–	4.6
Finland	66.8	73.2	78.8	82.4	87.7	83.4	17.8	18.6	20.2	16.3[a]	17.5	22.5
Sweden	74.1	77.2	83.6	88.1	85.2	87.5	19.1	19.9	20.0	26.5[a]	21.6	32.1
United Kingdom	52.8	64.2	71.7	64.0	76.6	78.2	17.1	18.9	20.5	–	20.5	27.5
Iceland	–	55.8	62.9	–	46.1	50.8	17.7	17.9	19.8	14.1	23.5	25.7
Norway	–	85.4	88.2	90.1a	95.0	96.2	17.6	17.8	18.2	–	13.3	17.8
Switzerland	–	81.8	86.9	83.7a	77.7	78.3	–	–	16.8	–	34.7	26.9

Where:
(–) no data available
[a] – data for the year 1996
1. Share of people aged 25–64 years possessing at least upper secondary education
2. Share of people aged 20–24 years possessing at least upper secondary education
3. Expected length of education during the lifetime
4. Life-long learning of working people aged 25–65, estimated as the share of people taking active part in training programs and receiving formal education during the 4 weeks preceding the examination of the entire population

Source: Europe in figures – Eurostat yearbook 2006–2007, Eurostat, Luxembourg 2006, http://epp.eurostat.ec.europa.eu/ (17.12.2007).

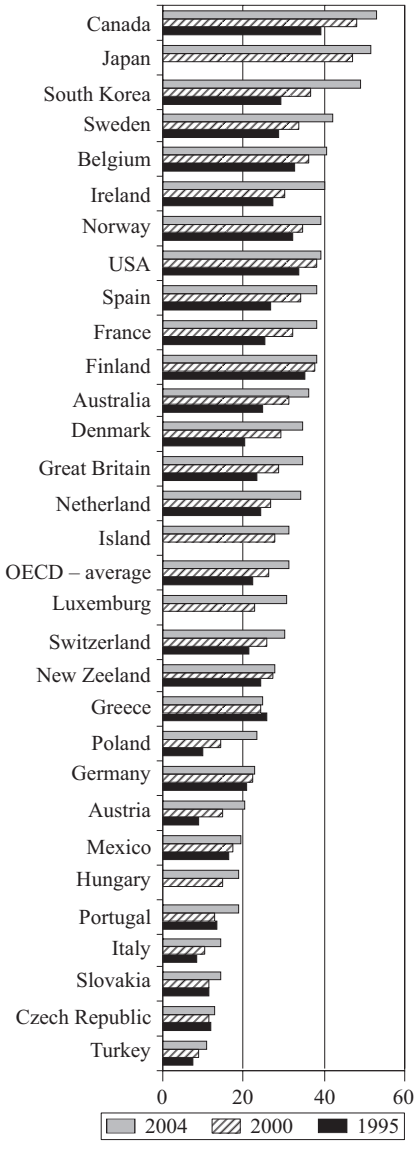

Fig. 1. Share of people with tertiary attainment in the population aged 25–34 years in the OECD countries during the years 1995–2004
Source: OECD [2007c, pp. 179–180] and http://puck.sourceoecd.org/vl=6735976/cl=25/nw=1/rpsv/factbook/ (18.01.2008)

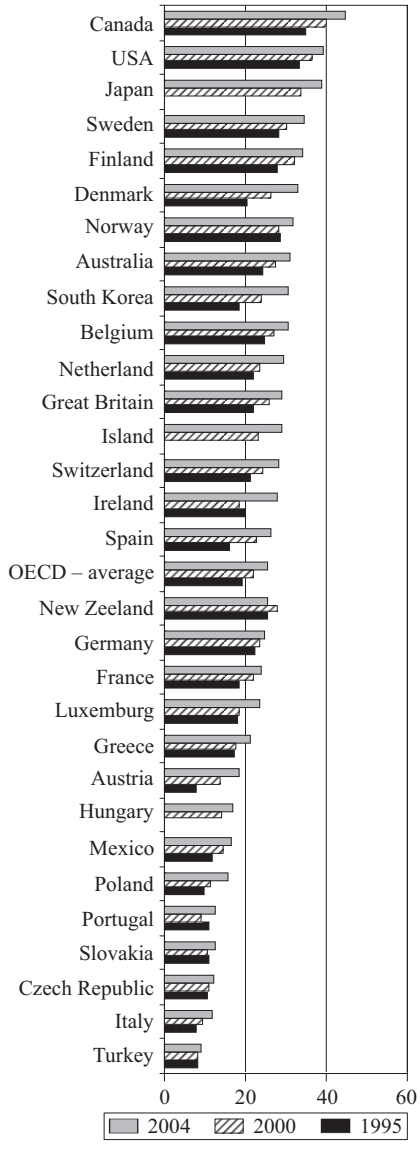

Fig. 2. Share of people with tertiary attainment in the population aged 25–64 years in the OECD countries during the years 1995–2004
Source: OECD [2007c, pp. 179–180] and http://puck.sourceoecd.org/vl=6735976/cl=25/nw=1/rpsv/factbook/ (18.01.2008)

already in 1995 as the Scandinavian countries or, e.g. the Baltic States. This indicates the educational convergence in the level of formal education in case of the economically developed countries. This is also confirmed by column 3 presenting the extending expected duration of education during the lifetime almost in all the countries.

The high rate of depreciation of the knowledge acquired during formal education is one of the major challenges that are faced by the educational systems in individual countries[8]. As a consequence, maintaining high quality of the human resources requires development of the ability of life-long education. Despite the high level of convergence in formal education (columns 1 and 2) we can talk about significant differences in the availability of training during the entire professional life in case of the EU countries, which is presented in column 4. In 2005, in the European Union (EU-27), 9,7% of professionally active people participated in training and education while in the Scandinavian countries and the United Kingdom or Switzerland that percentage was almost 30%. Comparing, however, the changes during the years 1995–2005 we can talk without exception about the quickly increasing awareness of the importance of life-long education process. This translates into high dynamics of educational-training services consumption.

Figures 1 and 2 present the share of people with tertiary attainment in the population aged 25–34 years in the OECD countries during the years 1995–2004 and the same indicator for the population aged 25–64 years. The presented data indicate that in all the OECD countries a significant increase in the share of people with tertiary attainment was recorded. In 2004, for the population aged 25–64 years, in case of almost a half of the countries the share of the population with tertiary attainment ranged 23–33%, while in Finland, Sweden, Japan, the USA and Canada that share was: 34%; 34.5%; 37.4%; 39.1% and 44.6% respectively. In the population aged 25–34 years those values were even higher while the average share of the people with tertiary attainment for OECD as a whole increased from 22.5% to 31%.

It must be concluded that Table 2 and Figures 1 and 2 indicate an increasing importance of knowledge as a global phenomenon.

Relations between: investments in research and development – technology – economy

Currently there is a consensus among the economists according to which innovation encompassing introduction of new products, new processes and

[8] The challenges that the national educational systems are facing in view of the global economic transformation are analyzed comprehensively by Ewa Okoń-Horodyńska (see: 2003, pp. 90–99; 1999, pp. 83–100).

improvement of the existing organizational solutions as well as technological changes concerning diffusion of new technological solutions are the key engines of economic development. However the mainstream economy is all the time far from development of the theory that would solve the issues of the complex influence of innovation and technological change on the process of economic development (for more see GODIN 2004, p. 687)[9]. Moreover, all the time we can talk about significant difficulties related to empirical identification of the influence of innovation and technological progress on economic growth. This is relatively simple in case of microeconomic studies limited to a selected economic sector or a defined group of enterprises (see: BRESNAHAN et al. 2002, pp. 339-376). However in case of studies of macroeconomic character, and even more in case of international comparisons, this is highly difficult[10].

Economists conducting studies on the national innovation systems highlight the position that attempting at developing a theory explaining the influence of innovation on economic growth rate one cannot limit the activities to narrowly understood influence of R&D institutions, and the more so the quantitative approach only, but a wide socio-economic context of those activities should also be considered[11]. However, despite the above objections, the analysis of contemporary literature of mainstream economy in the area, the endogenous growth theory and evolutional economy theory allows indicating the relations and mechanisms of links and influences between outputs on research and development, innovations and technological changes on one hand and the economic growth rate on the other. That is presented in Figure 3. Those mechanisms already have a relatively satisfying support in empirical analyses conducted, among others, by the OECD (2004, 2001, 2000).

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[9] It should be pointed out here, however, that the important achievements in that area are those by the economists developing the models of endogenous economic growth initiated by Paul Romer (1986, pp. 1002–10037), which should be treated here as the modern formalized theory based in the Schumpeterian tradition (see: Nelson 1997, pp. 29–58).

[10] The traditional theoretical problems, such as lack of leverage of microeconomic benefits of technological changes to macroeconomic benefits when those changes are the source of redistribution of the existing benefits only and do not create new ones, are supplemented by the problems with measuring the macroeconomic influence of innovation and the problems of ineffectiveness of the international statistical systems. The issue of effectiveness of measuring the influence of innovation on macroeconomic effects in itself is the source of immense controversies that have appeared during the two last decades. Currently the consensus was reached according to which the traditional statistical systems that were unable to identify the improvement in quality of goods and services at constant price level understated significantly the statistical influence of innovation on the gross domestic product. This applied in particular to the sectors characterized by high technological change intensity and innovation such as teleinformatics. Moreover, the time delays in obtaining macroeconomic benefits that are common in case of investments in the state-of-the-art technological solutions should also be remembered. Those delays result from the necessity of introducing complementary technological and organizational innovations and the necessity of securing the time necessary to obtain the sufficient level of diffusion of the new solutions in the economy.

[11] Critique of the approach typical for mainstream economy from the perspective of institutional economists can be found in the work by Ewa Okoń-Horodyńska (see: 1998a, pp. 41–45).

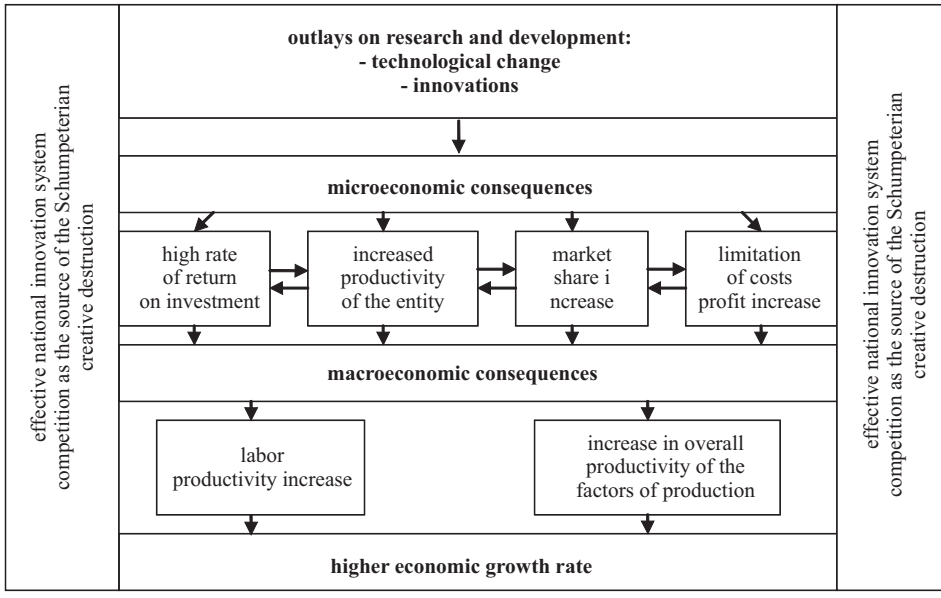

Fig. 3. Relations between outlays on research and development as the factor supporting innovation and stimulating the process of technological changes and economic growth
Source: own work based on: GRIFFITH et al. (2004, pp. 883–895), RAO et al. (2001, pp. 11–12), CAMERON (1998), FAGERBERG (1994, pp. 1147–1175).

Assuming the microeconomic perspective it may be concluded that economic entities decide fro investments in research and development, implementation of innovations and conducting technological changes aiming at increasing their productivity and limiting the operational costs while expecting a high rate of return on investment. This translates into the ability of the entity to increase its market share. All those elements are of course strongly correlated. However, as the innovational activity of a micro-subject bears a significant risk those potential microeconomic benefits are insufficient to stimulate innovation activities characterized by the same intensity in all sectors of the economy or in all the countries. This means that they must clearly translate into macroeconomic benefits (see: *Reaching*... 2002, *US Productivity*... 2001). Empirical studies prove that the major factors forcing entities to undertake activities of that type include effectiveness of the institutional system that should, first of all, support high competitive pressure and high flexibility of the economy (BAILY, LAWRENCE 2001, pp. 308–313). Where those conditions are satisfied, entities undertaking the innovative effort usually obtain higher than average productivity in their sectors and increase their market share, which, in the process of the dynamic market game forces the other, less active enterprises to

undertake the same innovative effort. On the other hand, market players that do not involve themselves in the innovative activities are eliminated from the market in the Schumpeterian process of creative destruction while their place is taken by the entities that are more active.

Efficient operation of that mechanism at the microeconomic level accelerates the innovation diffusion processes and supports obtaining positive external effects related to it. At the macroeconomic level this is reflected in increasing the general productivity of production factors and labor productivity. This is a condition for a higher economic growth rate (BAILY 2001, pp. 223–226). Econometric studies confirm statistical significance of the outlays on research and development and the product increase, which is the consequence of the direct influence of the R&D outlays on innovation of the economy and indirect influence on the effectiveness of technology transfer, which in turn translates into increasing the general productivity of production factors (see: GRIFFITH et al. 2004, pp. 883–895).

Although the aggregated rate of outlays on research and development for the OECD countries increased only from the level of 1,92% in 1981 to 2,26% in 2004 (OECD 2007, p. 147), more detailed empirical data provide important arguments in support of the thesis on the increasing importance of innovation and research and development outlays in creating conditions for economic potential increase. Table 3 presents the data concerning research and development outlays (column 1) and the share of the industrial sector in financing those outlays (column 2) for the major OECD countries during the years 1985-2005. The data presented in column 1 indicate a relative stability in the share of R&D outlays in the GDP, with the exception of Scandinavian countries, which during the analyzed period doubled their investments in that field to over 3%[12]. The data presented in column 2 indicate the increasing role of business in many countries in financing the research and development outlays. The situation was recorded in case of Denmark, Germany, Ireland, France, Slovenia, Finland, Sweden, Turkey, Iceland, the USA and Japan. For the so-called old European Union that ratio increased from 53,1% in 1995 to 54,8% in 2005.

[12] It is worth reminding that according to the international assessment of use of the potential of changes in the global economy by the European countries during the 1990s, only Scandinavian countries and Ireland scored positively in that area while the largest economies of Europe were unable to make use of the opportunities offered by the "new economy". Of course the R D outlays are just one of the elements of the national innovation system as a consequence of which this does not provide the straight empirical evidence confirming them as the condition for use of the potential of the "new economy".

Table 3
Outlays on research and development in selected OECD countries during the years 1985–2005

Country\year	1					2				
	1985	1990	1995	2000	2005	1985	1990	1995	2000	2005
EU-27	–	–	–	1.86	1.84	–	–	53	56.3	54.5
EU-15	–	–	–	1.92	1.91	–	–	53.1	56.6	54.8
Belgium	1.62	1.62[b]	1.67	1.97	1.84	66.5	64.8[b]	67.1	62.4	–
Denmark	1.19	1.55	1.82	2.24	2.45	48.9	49.3	45.2	59[c]	–
Germany	–	2.46[b]	2.19	2.45	2.48	61.1	63.5	60	66	66.8[d]
Ireland	–	0.83	1.26	1.12	1.26	45.7	59.1	67.4	66.7	58.7
Greece	0.27[a]	0.36[b]	0.43	0.6[c]	0.58	–	21.8[b]	25.5	24.2[c]	–
Spain	0.53	0.82	0.79	0.91	1.12	47.2	47.4	44.5	49.7	–
France	2.17	2.32	2.29	2.15	2.13	41.4	43.5	48.3	52.5	51.7[d]
Italy	1.10	1.25	0.97	1.05	1.10	44.6	43.7	41.7	–	–
The Netherlands	1.99	2.07	1.97	1.82	1.73	51.7	48.1	46	51.4	–
Austria	1.21	1.36	1.54	1.91	2.41	49.1	52.1	45.7	41.8	45.7
Portugal	–	0.51	0.54	0.76	0.81	28.3	27	19.5	27	–
Slovenia	–	–	1.57	1.41	1.46	–	–	45.9	53.3	65.2
Finland	1.54	1.84	2.26	3.34	3.48	–	56.3[b]	59.5	70.2	69.3[d]
Sweden	2.78	2.72[b]	3.32	3.6[c]	3.89	60.9	61.9[b]	65.5	67.8[c]	–
United Kingdom	2.24	2.14	1.94	1.85	1.76	45.9	49.6	48.2	48.3	44.2[d]
Turkey	–	0.32	0.38	–	–	–	27.4	30.8	42.9	–
Iceland	0.73	0.97	1.53	2.29[c]	2.78	24.1	23.9	34.6	43.4[c]	–
Norway	1.47	1.62[b]	1.69	1.63[c]	1.52	51.6	44.5[b]	49.9	49.5[c]	–
USA	2.73	2.63	2.49	2.74[e]	2.68[de]	50.3	54.6	60.2	68.6	61.4[d]
Japan	2.75	2.97	2.92	2.99[e]	3.13[de]	68.9	73.1	67.1	72.4	74.5[d]

Where:
1. Share of R&D outlays in the GDP;
2. Percent of R&D outlays financed by the industry;
[a] – data for 1986; [b] – data for 1991; [c] – data for 1999; [d] – data for 2004; [e] – source: OECD [2007 c, p. 147]; (–) – no data available.
Source: Eurostat, *Europe in Figures – Eurostat Yearbook 2006–2007*, http://epp.eurostat.ec.europa.eu/ (17.12.2007).

Increase in the level of R&D activities financing by business means stimulation of investments that are well focused on satisfying market requirements. This translates into a high added value of investments of that type. This is confirmed by a high correlation coefficient equal to 0,94 between R&D outlays financed by the industry and the number of new patents awarded in the OECD countries during the years 1996-2002. This has been presented in Figure 4.

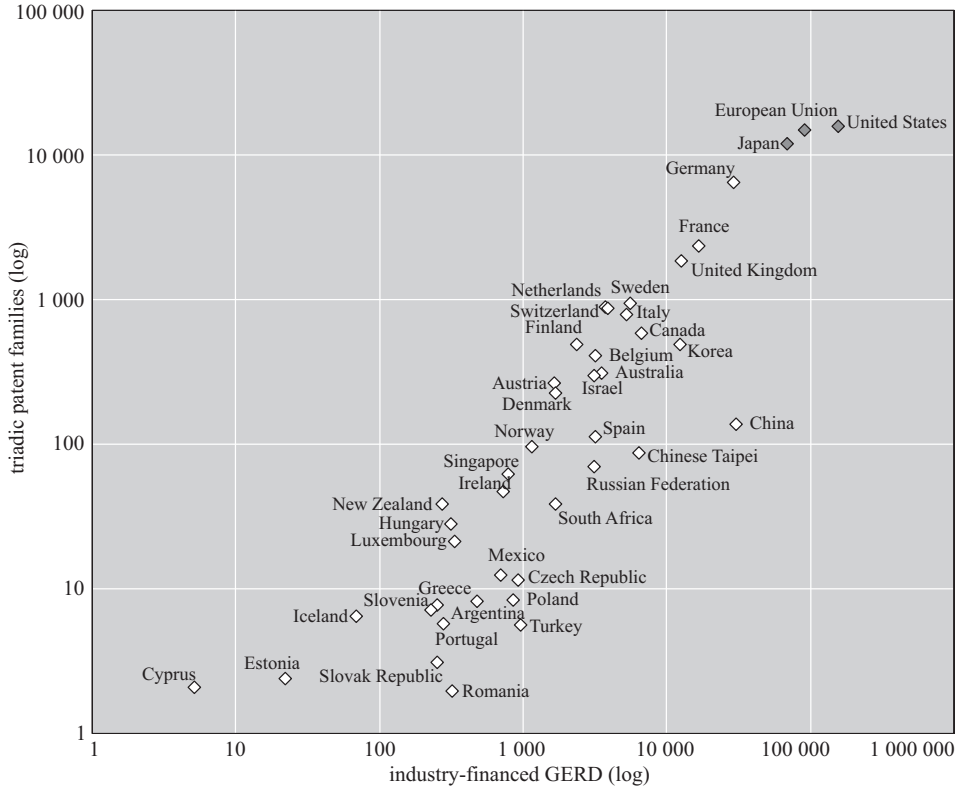

Fig. 4. Patents* and R&D outlays financed by the industry** during the years 1996–2002 in selected countries

* Patents in EPO, USPTO and JPO. Data for the years 2000 2002 represented a projection,

** R&D outlays financed by the industry in millions 2000 USD based on the purchasing power parity delayed by one year.

Source: OECD, *Patent and R&D Databases*, December 2005.

Increase in the R&D outlays financed by industry, however, when accompanied by stagnation or even a decrease in outlays of that type by the government, may mean limitation of financing for research in the area of general application technologies. Such technologies, because of the costs and risk level, are much less frequently financed by the private sector while general application technologies are the source of the basic benefits leading to the increase in general productivity of production factors. That problem undoubtedly is one of the major challenges for individual countries. This applies in particular to the countries that are leaders in the global technology race and that cannot benefit from the so-called convergence rent. The increase of business interest in R&D type activities in itself, however, indicates an

increasing role of innovation in creating the microeconomic success of business entities, which, in case of maintaining adequate institutional conditions translates into macroeconomic benefits.

Comparing the volumes of R&D outlays in countries with different sizes of economic potential it should also be remembered that investments of that type may also play a different role in stimulating economic growth in small and large economies. A lot indicates that in case of the later ones outlays on R&D contribute mainly to increasing the innovation level of the economy. In case of the small economies the domestic outlays on research and development represent a very important factor increasing the capacity of the economy for transfer and diffusion of foreign technologies, which also is one of the most important conditions for closing the developmental gaps[13].

Strong arguments for the thesis on the increasing role of innovation in creating welfare are provided by empirical data on the number of patents awarded in the OECD countries. The information contained in the data concerning the numbers of patents awarded is particularly important as it represents the main synthetic measure of effectiveness of the national innovation system in a given country. Figure 5 presents the number of patents awarded in the OECD countries during the years 1985–2002. Figure 6 represents the same measure for the United States, Japan and Germany. The data shows that during the analyzed period the number of patents awarded increased fourfold.

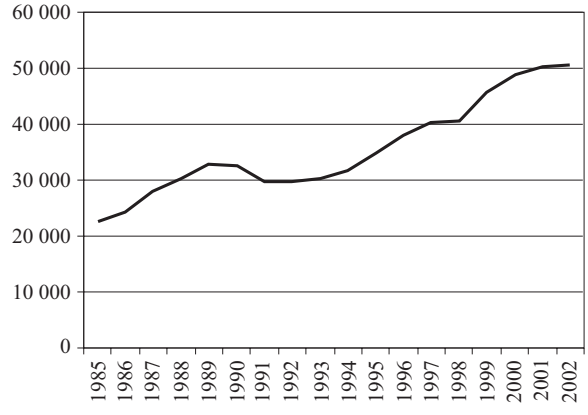

Fig. 5. Number of patents awarded in OECD countries during the years 1985–2002
Source: own work based on: OECD, *OECD Compendium of Patent Statistics*, 2005 http://www.oecd.org/topicstatsportal/0,3398,en_2825_497105_1_1_1_1_1,00.html#500742 (15.12.2007).

[13] Those issues are analyzed in detail by Rachel Griffith, Stephen Redding and John Van Reenen on the basis of the analysis of the influence of R D outlays on innovation and technology transfer rate fro twelve OECD countries (see: Griffith et al. 2004, pp. 883–895).

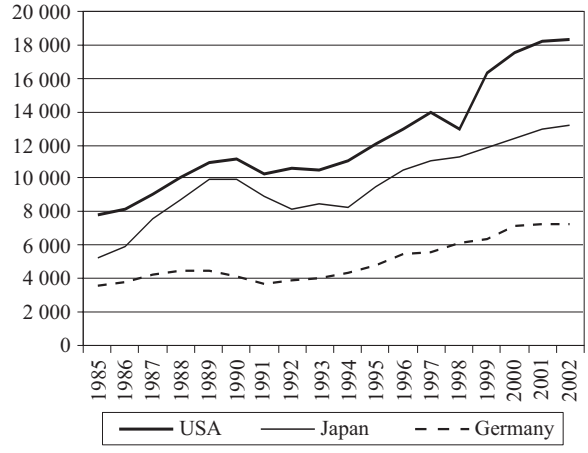

Fig. 6. Number of patents awarded in the USA, Japan and Germany during the years 1985–2002
Source: own work based on: OECD, *OECD Compendium of Patent Statistics*, 2005 http://www.oecd.org/topicstatsportal/0,3398,en_2825_497105_1_1_1_1_1,00.html#500742 (15.12.2007).

In addition to the data presenting the changes of the phenomenon studied in absolute values it is also worth to analyze the relative indicators such as, e.g. the relation of the number of patents awarded to the GDP or the number of patents awarded per million residents. Figure 7 presents the first of those indicators for the years 1991 and 2002. Figure 8 concerns the later of the two earlier mentioned indicators. Both figures confirm a strong increase in the relation of patents awarded to the GDP and an increase in the number of patents ac compared to the population of the given country.

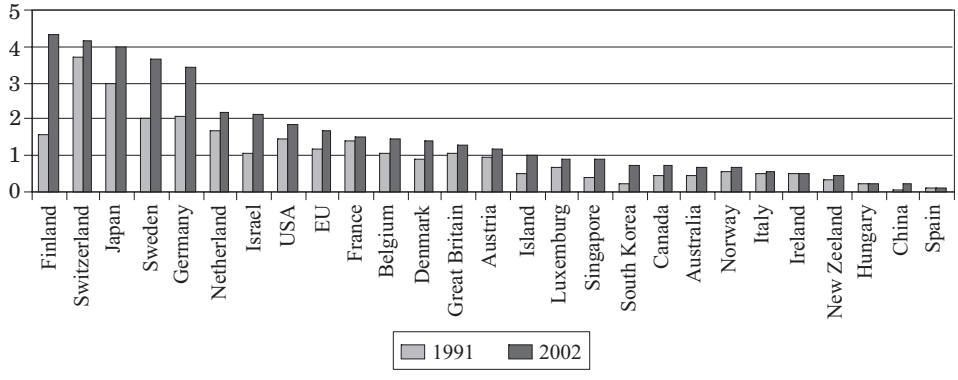

Fig. 7. Relations of the number of patents awarded to the GDP in selected countries in 1991 and 2002*
* GDP, billion 2000 USD using the purchasing power parity, EU covers the EU – 15.
Source: OECD, *OECD Compendium of Patent Statistics*, 2005 http://www.oecd.org/topicstatsportal/0,3398,en_2825_497105_1_1_1_1_1,00.html#500742 (15.12.2007).

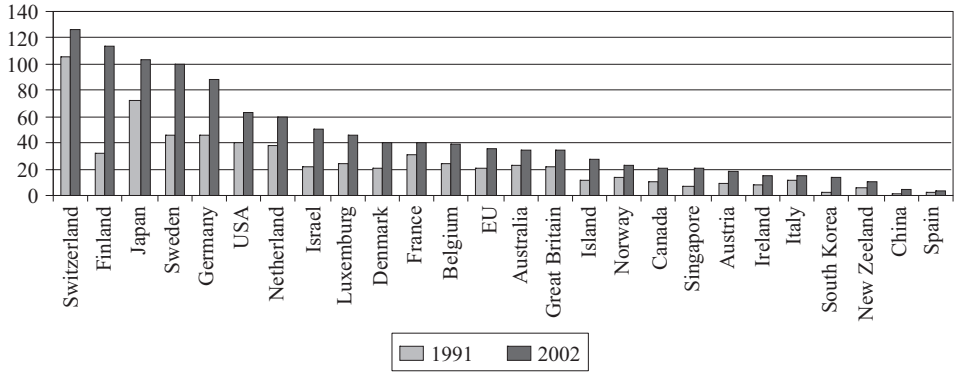

Fig. 8. Number of patents awarded per million residents in selected countries in 1991 and 2002
Source: OECD, *OECD Compendium of Patent Statistics*, 2005
http://www.oecd.org/topicstatsportal/0,3398,en_2825_497105_1_1_1_1_1,00.html#500742 (15.12.2007).

That growth is frequently explained by changes in legal regulations concerning protection of the intellectual property rights. In particular, this applies to the United States where as of mid-1970s regulations related to patent protection have been implemented covering innovations in the teleinformation sector. Robert Hunt, however, indicates that not only those changes were responsible for the increase in the number of registered innovations in the high technologies sector where the dynamics of patents awarded was the highest. He presents a formal model indicating that the earlier mentioned modification in protection of the intellectual property rights could lead to decreasing the propensity for investing in research and development in the sector of the highest technologies, which, however, did not take place as a result of coincidence of other factors (HUNT 1999a, pp. 4–9, 1999b, pp. 18–21)[13]. In case of the majority of the European Union countries we cannot point at such modifications in the institutional system although the increase in the number of patents awarded relative to the GDP was recorded in those countries. Additionally, in Finland, Sweden, Germany, The Netherlands and countries outside the European Union such as Japan, Switzerland and Israel that increase was even higher than in the United States. This indicates to a large extent the universality of that phenomenon. As the consequence the data indicates the increasing role of R&D and innovation investments in functioning of the countries in the reality of the new global economy.

[14] This proves how important and at the same time sensitive issue in the realities of the "new economy" the issue of regulation and modification of the intellectual property rights protection system is (more see: Balcerzak, Rogalska 2008, pp. 71–88).

Conclusions

The above presented arguments confirm that widely treated innovation and intangible economic resources such as the knowledge are currently among the most important elements influencing functioning of contemporary highly developed economies. That comment applies to both micro- and macroeconomic perspective. From the perspective of an individual enterprise or sector the entities must implement process, product and organizational innovations to be able to satisfy the increasing requirements of the business partners and clients and at the same time retain or increase the distance from their competitors that frequently operate in global markets. Implementation of such innovations requires human resources with appropriate knowledge available.

From the macroeconomic perspective the studies confirm that countries implementing the economic policy compatible with those fundamental processes and able to modify their institutional systems efficiently and at sufficiently rapid pace were able to make better use of their potential created by that economic-technological transformation process. On the other hand, the history of the earlier technological-economic "revolutions" proves that ignoring fundamental changes and absence of adequate actions by the state not only makes use of the potential stemming from the new reality impossible but also results in the erosion of strengths of the given economy.

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ECONOMIC EFFECTIVENESS OF PRIVATE ENTERPRISES IN POLAND – REGIONAL APPROACH

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K e y w o r d s: private enterprises, effectiveness, regional diversification.

A b s t r a c t

The aim of the undertaken research was to assess the regional diversification in economic effectiveness of private enterprises in Poland. The assessment was conducted at NUTS II regional level encompassing the voivodships for two selected years – 1999 and 2006. The studies confirmed that regional diversification is indicated by all three indicators of the economic effectiveness of enterprises, i.e. labor productivity, gross return on capital employed and return on equity. However the scale of that diversification measured by the variability coefficient level decreased during the period covered. For example, in 1999 the variability coefficient for the ROE was as much as 75.5%, which means high diversity of voivodships as, concerns the level of that indicator. On the other hand, in 2006 that indicator was at the level of 18,9% and the voivodships proved less diversified as concerns that indicator.

EFEKTYWNOŚĆ EKONOMICZNA PRZEDIĘBIORSTW PRYWATNYCH W POLSCE – UJĘCIE REGIONALNE

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S ł o w a k l u c z o w e: przedsiębiorstwa prywatne, efektywność, zróżnicowanie regionalne.

A b s t r a k t

Celem podjętych badań była ocena regionalnego zróżnicowania efektywności ekonomicznej przedsiębiorstw prywatnych w Polsce. Ocenę przeprowadzono na poziomie regionalnym NUTS II, obejmującym województwa w dwóch wybranych latach – 1999 i 2006. Badania potwierdziły, że zróżnicowanie regionalne wykazują wszystkie trzy wskaźniki efektywności ekonomicznej przedsiębiorstw, tj. wydajność pracy, rentowność obrotu brutto i rentowność kapitału własnego.

Skala tego zróżnicowania mierzona poziomem współczynnika zmienności w badanym okresie jednak się zmniejsza. Przykładowo w roku 1999 współczynnik zmienności dla wskaźnika ROE wynosił aż 75,5%, co oznaczało dużą niejednorodność województw pod względem poziomu tego wskaźnika. W roku 2006 współczynnik ten wynosił 18,9%, a województwa okazały się najmniej zróżnicowane pod względem tego właśnie wskaźnika.

Introduction

Economic effectiveness of enterprises can be considered and assessed in micro-scale, i.e. in relation to the entire enterprise or one of the production factors engaged in that enterprise or in macro-scale, i.e. in relation to the entire national economy (TARACIŃSKA 2006, p. 243). Microeconomic assessment is of fundamental importance for owners of enterprises, their partners and competitors and it is the necessary condition for any effectiveness of all other tiers of the economy. Assessment of the economic effectiveness at macro level provides, on the other hand, the information on efficiency of activities of all the enterprises in the country and, indirectly, on the situation of the entire society. Currently, however, not only the enterprises or countries but also territorial units such as regions are the competing entities. The increasing role of the regions as the basic units for statistical comparisons concerning the development of individual member countries of the European Union indicates the need for assessment of the effectiveness of enterprises also from the regional perspective. Diagnosing the condition of the regional diversification in the economic effectiveness of enterprises and answering the question of "Do regional differences in the level of economic effectiveness of enterprises increase or are they being closed?" is becoming an important issue as it is generally known that excessive diversification has a negative influence not only on the poorer areas but also the global interest of the country and additionally results in negative political, economic and social consequences.

In view of the above, the aim of the studies undertaken was to assess the regional diversification in economic effectiveness of private enterprises in Poland. The considerations of this paper focus around the following research hypothesis: *The regional differences in the level of economic effectiveness of private enterprises in Poland increase*.

The study encompassed private enterprises in Poland that maintain accounting ledgers in which the employment exceeds 9 persons. The studies were conducted at the regional level of NUTS II, which according to the Regulation by the Council of Ministers of the 14th of November 2007 on implementation of the Nomenclature of the Territorial Units for Statistical Purposes, cover the voivodships. The time scale of the presented studies, as a consequence of the limited volume of the paper, covers two selected years – 1999 and 2006.

The study uses the data of the Central Statistical Office published in the statistical yearbooks of individual voivodships as well as the unpublished data made available on request by the author in the regional system of 16 voivodships. The comparative method was applied for analysis of the collected data, that is the values of the studied indicators of economic effectiveness of private enterprises for all the voivodships for the two years covered were compared. The variance measures were also used that according to M. SOBCZYK (2007, p. 48), serve determining the diversity of units in the statistical population as concerns the value of the characteristic studied. In this paper they served determining the degree of diversification of the individual indicators of economic effectiveness of enterprises in the regions and determining whether the regions are homogenous or non-homogenous as concerns the indicators investigated.

Economic effectiveness of enterprises and its measures

The category of effectiveness has accompanied human activities for thousands of years being more or less consciously the result of the inherent rationality of doing things and as a consequence it is the subject of assessment for uncounted levels of economic activities (KOZUŃ-CIEŚLAK 2005, p. 201). In economic literature, however, the definition of effectiveness as an independent notion is not given. According to the economists, effectiveness (similar to, e.g. percent) has "no reason for independent existence" and it is organically bound to a specific object of study (RYBICKI 2005, p. 362). That category, as a consequence, should be applied to a specific activity carried out at a specific place and conducted within a strictly determined timeframe. That approach indicates the need for relativization of effectiveness to specific entities, particularly enterprises (subject effectiveness), selected processes implemented by them (object effectiveness) and defined set of enterprises (macroeconomic effectiveness) (BIEDACZ 2001, p. 289). Additionally, according to H. PFOHL (1998, pp. 32-34), the issues of effectiveness of enterprises; activities should be interpreted in the context of four dimensions: technological, economic, social and ecological.

Economic effectiveness that is the subject of the studies presented in this paper expresses the relation between the effects obtained and the outlays incurred (MATWIEJCZUK 2000, p. 29). It is understood as the result of practical application of the rational management principle that represents maximization of the economic results at given outlays or minimization of outlays at a given economic result. It is the result of economic activities and most frequently it is defined as the relation between the results achieved and the outlay of factors necessary for obtaining them (MELICH 1980, p. 17, *Nowa*

Encyklopedia... 1995, p. 192, PIĘTOWSKA-LASKA 2005, p. 172, CZAKON 2005, p. 58, WASZCZYŃSKI 2005, p. 31). It is among the characteristics determining the nature of the enterprise, it conditions the operations of the organizations and determines their development (OSBERT-POCIECHA 2006, p. 8).

The relation of effects to outlays expressed in numbers is the measure of the level of economic effectiveness of a specific entity or tier of the economy (*Ekonomia od A do Z...* 2007, p. 105). According to A. SKOWRONEK-MIELCZAREK (2007, p. 31), in economic practice, analysis of enterprise operation effectiveness represents in most cases the holistic approach to its operation from the perspective of the development of specific financial relations. The choice of appropriate methods and tools for effectiveness measurement, nevertheless, is not a simple task. Computation of effectiveness indicators, particularly in the situation when the analysis is to be conducted in macro scale or according to the regional approach may represent an issue as while collection of the data necessary for computation of the effectiveness indicators for a specific enterprise is relatively simple, in macro scale where the studies encompass a large sample of enterprises conducting diversified activities collection of such data may prove impossible. That is why analysis of effectiveness of enterprises conducted in macro scale or at regional level is generally based on the indicators computation of which is possible on the base of the available aggregated data concerning all the entities studied. In view of the above, in this paper the following measures were assumed for measurement of economic effectiveness level of private enterprises in Poland according to the regional approach: labor productivity, gross profitability of trade and return on equity.

Labor productivity belongs to the so-called measures of productivity, which in the subject literature are used the most frequently for measurement of effectiveness of enterprises. This can be justified by the fact that "*the improvement of effectiveness is usually treated as equivalent to the increase in productiveness of production factors*" (ŚWIECZEWSKA 2004, pp. 29–30). The labor effectiveness indicator for the enterprises covered was computed as the relation between the revenues from their entire activities and the employment of those enterprises. The gross trade profitability indicator represents the relation between the gross financial results to revenues from the entire activity. The indicator computed in that way is the most inclusive indicator of the profitability of sales. It encompasses the entire business activity (operational + financial) adjusted by the balance of extraordinary events. It is commonly applied in assessment of profitability of enterprises and used for comparisons between industries and international ones as it does not react to the differences in the income taxes (GRZENKOWICZ et al. 2007, p. 209). The last of the effectiveness indicators chosen – the return on equity, allows assessment of the effectiveness of use of the capital provided by the owners in the enterprise. It "shows" the owners how much they may earn on investment in

a given enterprise and allows assessment of profitability of capital placed in it covering not only the capital invested but also not disbursed profits that were left available to the enterprise (KORNACKI 2008, p. 65). According to R. PASTUSIAK (2003, p. 101), that indicator is one of the most important measures in the market economy.

Regional diversification of economic effectiveness of private enterprises in Poland

In 1999, the study covered 43.363 (*Bilansowe wyniki...* 2001) private enterprises operating in Poland while in 2006 the number of enterprises covered was 43.971 (*Bilansowe wyniki...* 2007). During both years analyzed, private enterprises represented over 90% of the total number of enterprises in Poland employing more than 9 persons and maintaining accounting ledgers. The analysis of the levels of effectiveness indicators for those enterprises from regional perspective showed a significant diversification among them.

In 1999, the labor productivity indicator assumed the following values in the individual voivodships (Fig. 1).

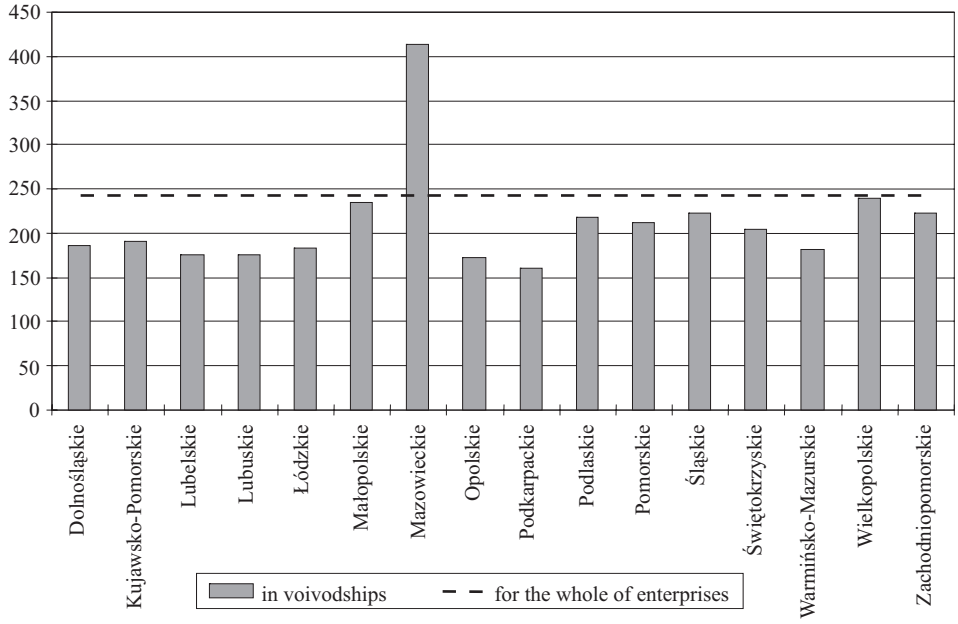

Fig. 1. Labor productivity in enterprises studied in 1999 (PLN K/employee)
Source: own work based on the unpublished CSO data from SP and F-02 financial reports of the investigated entities.

The data presented in Figure 1 indicate that the highest labor productivity was recorded by enterprises situated in Mazowieckie voivodship at PLN 413,000 per 1 employee and that it was higher by PLN 170,400 than the productivity indicator computed for the entire studied population of enterprises in Poland, which was PLN 242,600. In the remaining voivodships the labor productivity indicator was below the value computed for the entire population of enterprises covered. The Podkarpackie voivodship was one with the lowest labor productivity indicator in 1999 as it was at the level of PLN 160,700 per 1 employee. The difference between the highest and the lowest value of the labor productivity indicator computed for individual voivodships was PLN 252,300 per 1 employee.

In 2006, the labor productivity indicator in individual voivodships was as presented in Figure 2.

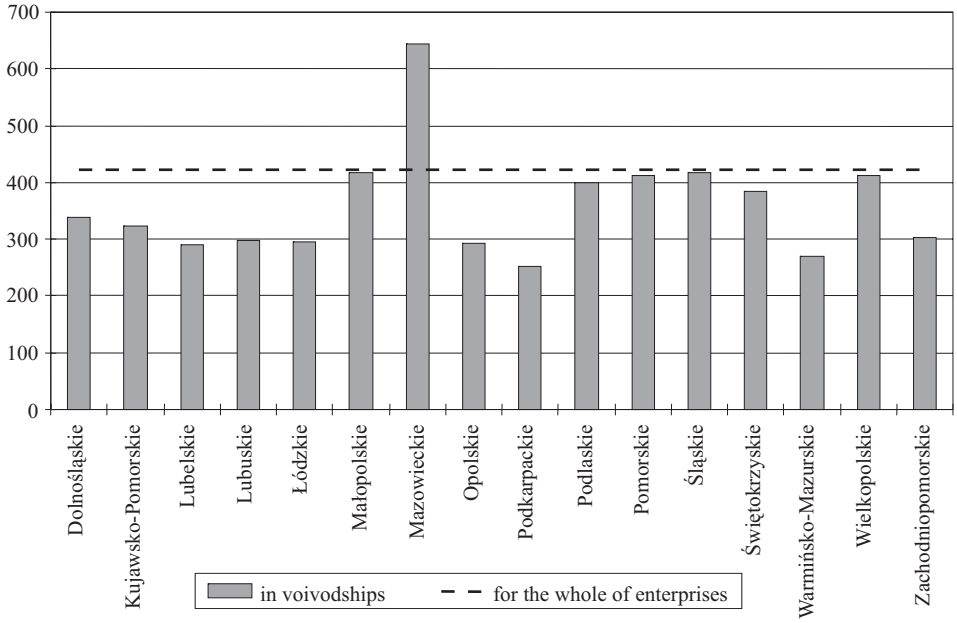

Fig. 2. Labor productivity in enterprises studied in 2006 (PLN K/employee)
Source: own work based on the Statistical Yearbooks for individual voivodships of 2007.

Mazowieckie voivodship continued to be the one with the highest labor productivity indicator. The labor productivity indicator for enterprises situated in that voivodship was at the level of PLN 643,400 per 1 employee. Similar to the situation in 1999, Podkarpackie voivodship was the one with the lowest value of that indicator at PLN 252,200 per 1 employee. Similar to the situation

of 1999, only in Mazowieckie voivodship the labor productivity indicator was higher than the value computed for the entire population of enterprises in the country that was PLN 421,800 per 1 employee. The difference between the highest and the lowest value of the labor productivity indicator in the individual voivodships was PLN 391,200 per one employee.

In analyzing the next indicator – the gross profitability of trade – its regional diversification can also be noticed. In 1999, it was as in Figure 3.

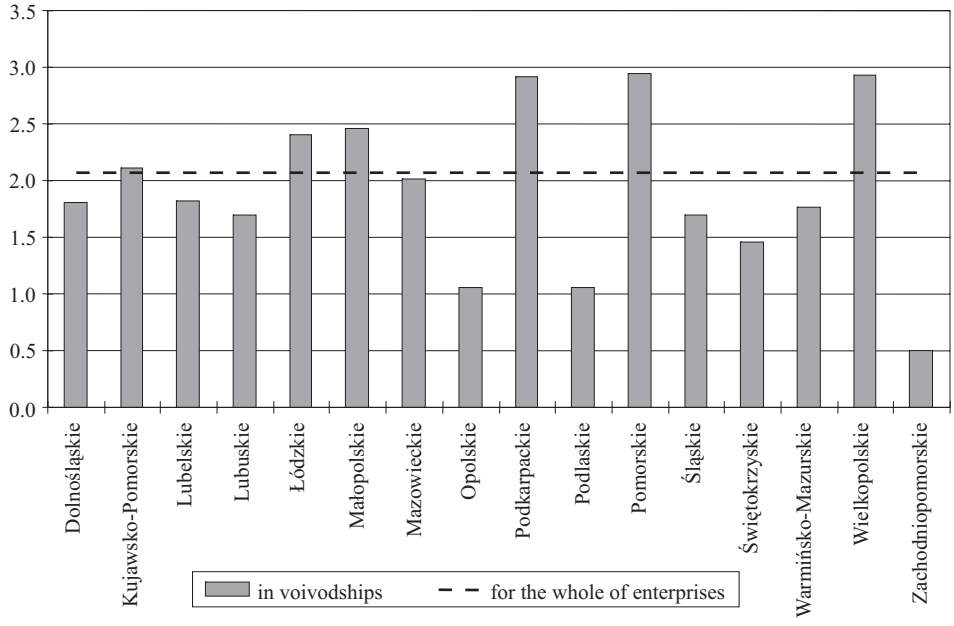

Fig. 3. Indicator of gross profitability of trade in enterprises covered in 1999 (in %)
Source: own work based on the unpublished CSO data from SP and F-02 financial reports of the investigated entities.

The highest gross profitability of trade in 1999 was achieved by enterprises from Pomorskie, Wielkopolskie and Podkarpackie voivodships for which that indicator reached the level of 2.9% and was higher than the indicator computed for the entire population of enterprises in Poland by 0.8 percent point. Zachodniopomorskie voivodship recorded the lowest profitability indicator. Enterprises of the private sector situated in that voivodship recorded profitability at the level of 0.5%, that is 1.6 percent point lower than the indicator computed for the entire population covered by the study in 1999. The difference between the highest and the lowest value of the gross profitability of trade indicator values for individual voivodships was 2.4 percent points.

The regional diversification in the level of that analyzed indicator was also visible in 2006, which is confirmed by the data presented in Figure 4.

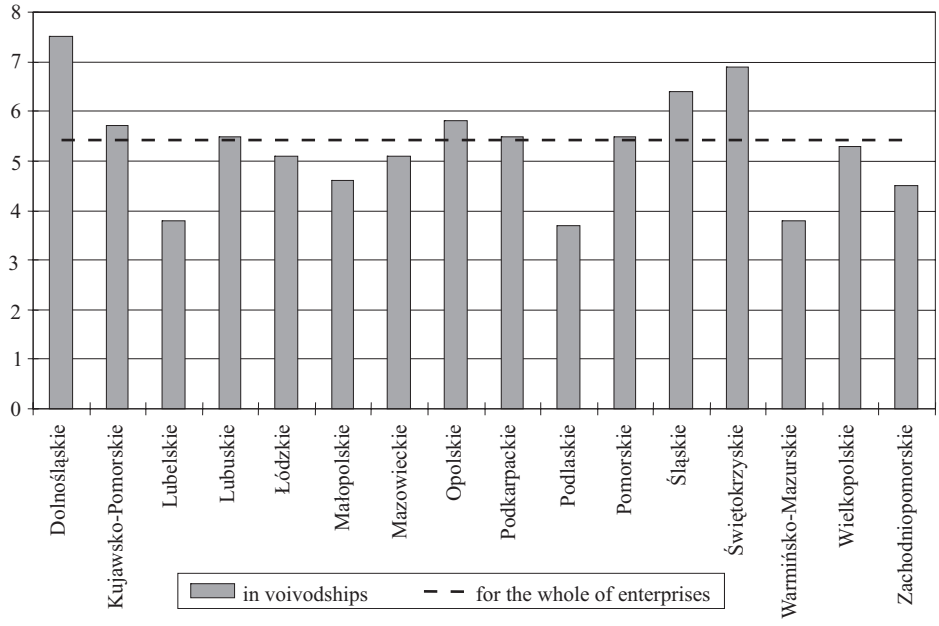

Fig. 4. Indicator of gross profitability of trade in enterprises covered in 2006 (in %)
Source: own work based on the Statistical Yearbooks for individual voivodships of 2007.

The highest gross profitability of trade during that year was recorded by enterprises in Dolnośląskie voivodship at 7.5% and Świętokrzyskie at 6.9%. Podlaskie voivodship was the one that achieved the lowest value of that indicator during that year. Enterprises situated in it recorded the profitability at the level of 3.7% while the indicator for the entire population of enterprises studied in Poland was at the level of 5.4%. The difference between the highest and the lowest value of that indicator computed for individual voivodships was 3.8 percent points.

Regional diversification in the effectiveness of private enterprises in Poland was also confirmed by the analysis of the level of the last effectiveness indicator – the return on equity. In both 1999 (Fig. 5) and 2006 (Fig. 6) significant differences between the highest and the lowest values of ROE computed for individual voivodships were recorded. In 1999, it was 6.7 percent points while in 2006 as much as 7,5 percent points. As indicated by the data presented in Figure 5, Podkarpackie voivodship was the one with the highest value of the ROE in 1999. Enterprises situated in that voivodship recorded the profitability

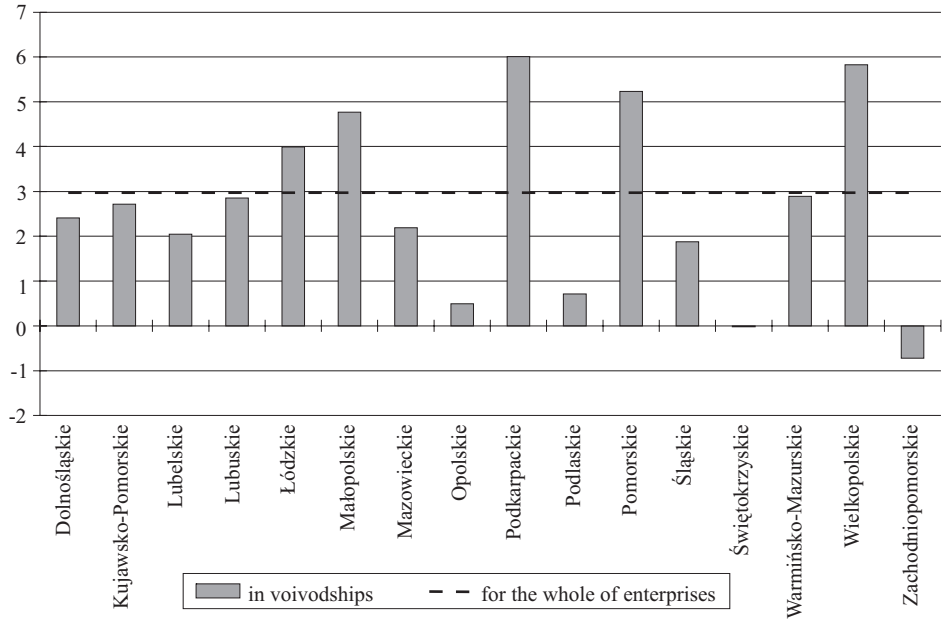

Fig. 5. Indicators of the return on equity in enterprises covered in 1999 (in %)
Source: own work based on the unpublished CSO data from SP and F-02 financial reports of the investigated entities.

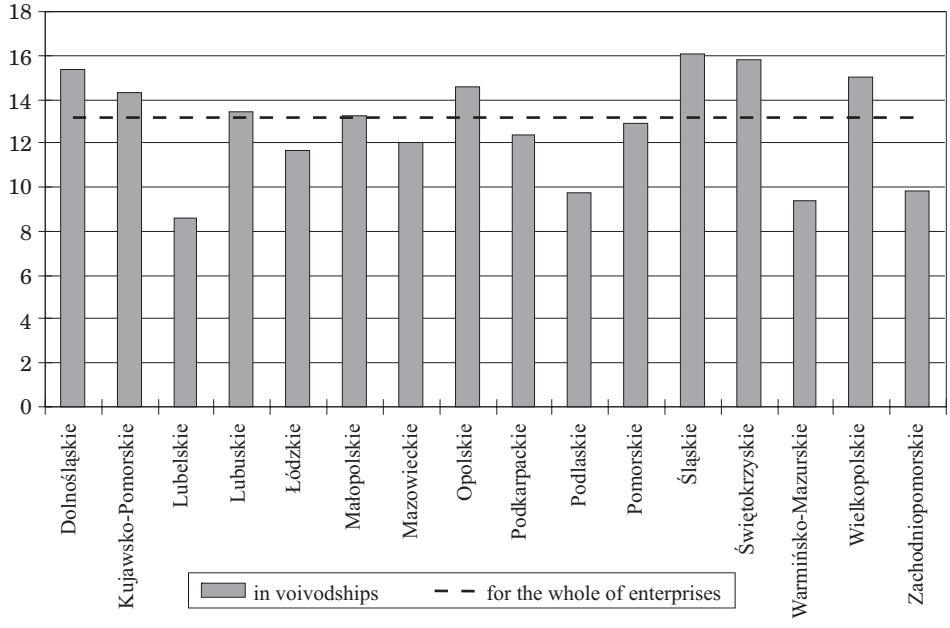

Fig. 6. Indicators of the return on equity in enterprises covered in 2006 (in %)
Source: own work based on the Statistical Yearbooks for individual voivodships of 2007.

at the level of 6.0%. On the other hand enterprises situated in Zachodniopomorskie and Świętokrzyskie voivodships proved unprofitable as the ROE computed for those enterprises was at the level of -0.7% and -0.02% respectively. Only in case of five voivodships the ROE computed for enterprises situated in them was higher than the value computed for the entire population of enterprises covered by the study that was at the level of 3.0%. In the remaining eleven voivodships the values of that indicator were lower than the value for the entire population of enterprises covered.

In 2006, Śląskie voivodship recorded the highest value of the ROE at 16.1%. The lowest returns on equity at 8.6% was recorded by enterprises situated in Lubelskie voivodship. In case of a half of voivodship the values of the ROE for enterprises situated in them were higher than the value computed for the entire population of enterprises in Poland covered by the study that reached the level of 13.2%.

Analysis of the level of economic effectiveness indicators for enterprises from the individual regions showed that the effectiveness of enterprises is diversified spatially. This is confirmed also by the values of the measures of variation presented in Table 1 computed for the three analyzed characteristics (effectiveness indicators) and two years covered.

Table 1

Variation measures for indicators of economic effectiveness of private enterprises in Poland in 1999 and 2006

Effectiveness indicators / Variation Measure	Labor productivity (PLN K/employee)		Gross profitability of trade (%)		Return on equity (%)	
	1999	2006	1999	2006	1999	2006
Minimum	160.69	252.21	0.5	3.7	-0.7	8.6
Maximum	413.02	643.36	2.9	7.5	6.0	16.1
Spread	252.33	391.16	2.4	3.8	6.7	7.5
Standard deviation	58.7	95.4	0.7	1.1	2.0	2.4
Coefficient of variation	27.7	26.6	37.0	20.4	75.5	18.9

Source: own work based on the unpublished CSO data from SP and F-02 financial reports of the investigated entities and Statistical Yearbooks for individual voivodships of 2007.

As indicated by the data in Table 1, voivodships show significant diversification in all three analyzed effectiveness indicators. The coefficients of variation computed for each of them for both years covered by the study assumes the values exceeding 10%. In 1999, the voivodship were most diversified as concerns the return on equity. The coefficient of variation for that characteristic was 75.5% meaning lack of homogeneity among the voivodships. A minor

diversification was recorded as concerns labor productivity and gross profitability of trade. The situation in 2006 looked different. Although the regional diversity within all the analyzed characteristics was at the moderate level the regional differences in the returns on equity decreased significantly. In 2006, that characteristic was the least diversified within the regional system. The diversity of labor productivity on the other hand decreased slightly. The coefficient of variation for that characteristic decreased from 27.7% in 1999 to 26.6% in 2006.

Conclusions

Analysis of regional diversity in the level of economic effectiveness of private enterprises in Poland conducted for the years 1999 and 2006 indicated that the regional differences in the levels of studied enterprises effectiveness indicators during the period studied decreased. Despite that trend, in 2006, the voivodship still showed significant diversification as concerns the three analyzed indicators of economic effectiveness of enterprises. This is confirmed by the value of the coefficient of variation, which for all the studied indicators exceeded the level of 10%. That coefficient assumed the highest value for the labor productivity indicator at 26.6%, which means that in 2006 the voivodships were diversified the most as concerns that indicator. The indicator of the return on equity for which the coefficient of variation assumed the value of 18.9% showed the lowest diversification among the voivodships

More detailed analyses conducted during the study showed that:

1. In 1999, Mazowieckie voivodship was the one with the highest labor productivity indicator. Private enterprises situated in that voivodship registered labor productivity at the level of PLN 413,000 per 1 employee while enterprises situated in the voivodship with the lowest value of that indicator, i.e. Podkarpackie voivodship, registered the productivity at the level of PLN 160,700. The spread between those values exceeded PLN 252,000 per 1 employee. In 2006, similar to 1999, Mazowieckie voivodship recorded the highest level of the labor productivity indicator while Podkarpackie voivodship the lowest level of that indicator. Enterprises situated in those voivodships registered the following values of the labor productivity coefficients: Mazowieckie – PLN 643,000 and Podkarpackie – PLN 252,000. The spread between those values was over PLN 391,000 per 1 employee in 2006. Comparing the data for 1999 with those for 2006 it can be concluded that during the period studied labor productivity in the enterprises covered in all voivodships increased, however, the absolute difference between voivodships with the highest and the lowest level of that indicator increased. On the other hand, from the relative

perspective the regional differences in the level of the labor productivity indicator computed for enterprises situated there decreased slightly, which is confirmed by the decrease in the value of the coefficient of variation from 27.7% in 1999 to 26.6% in 2006.

2. Regional diversity also occurs in case of the gross profitability of trade indicator. In 1999, the absolute difference between the highest and the lowest value of that indicator computed for the private enterprises situated in individual voivodships was 2.4 percent points while in 2006 3.8 percent point. The situation looks different if we apply the relative measure of variation considering the arithmetic average for the voivodships. The decrease in the value of the coefficient of variation from 37% in 1999 to 20.4% in 2006 indicates that the scale of diversification of voivodships as concerns gross profitability of trade for private enterprises situated in their area decreased.

3. Comparative analysis of the levels of the return on equity for private enterprises situated in individual voivodships showed that significant regional diversification existed also in that indicator. In 1999 the voivodships were diversified the most as concerns that indicator. The coefficient of variation for the ROE in 1999 was as much as 75.5%, which means high non-homogeneity of voivodship as concerns that characteristic. The fact seems interesting that during the period covered the diversification in that indicator decreases significantly and in 2006 the coefficient of variation for the ROE was at the level of 18.9%, and the voivodships were the least diversified as concerns that indicator.

Concluding, the comparative analysis of the levels of economic effectiveness indicators for private enterprises in individual voivodships showed that they are diversified regionally, although the scale of that diversification measured by the level of the coefficient of variation decreased during the period covered. As a consequence the hypothesis concerning deepening of the regional differences in the level of economic effectiveness of private enterprises in Poland was rejected.

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ANALYSIS OF EXPENDITURES ON LABOR MARKET POLICY IN POLAND DURING THE YEARS 1990–2008

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K e y w o r d s: labor market policy, Labor Fund, active instruments of the labor market.

A b s t r a c t

Labor market policy implemented within the frameworks of active and passive programs financed from the Labor Fund is an element of the Polish model of combating unemployment. The role of these programs represents activation of the unemployed, promotion of employment and mitigating activities. High implementation costs of that policy, however, cause that for years it has been the subject of fierce critique that frequently questions the sense of its application. The fundamental problem that appears in the analysis of the role of those programs is the share of the expenditures on active forms of preventing unemployment in the total expenditures involved in implementation of that policy. The Labor Fund, since the beginning of its functioning, has been considered to be mainly a passive funds serving generally the mitigation measures for the unemployed. For 19 years they consumed { of the funds allocated for implementation of all the measures. Only during the last 4 years the evolution in the approach to implementation of the labor market programs and changes in the structure of expenditures for the purpose could be observed.

That is why it seems that presentation of the level and structure of expenditures from the Labor Fund since the beginning of its operation (1990–2008) is useful to present the changes that take place in both the level and the structure of Labor Fund expenditures for active and passive labor market programs. Additionally, presentation of the correlation between the changes in the expenditures of the Labor Fund and the level of unemployment seems interesting.

ANALIZA WYDATKÓW NA POLITYKĘ RYNKU PRACY W POLSCE W LATACH 1990–2008

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S ł o w a k l u c z o w e: polityka rynku pracy, Fundusz Pracy, aktywne instrumenty rynku pracy.

A b s t r a k t

Elementem polskiego modelu zwalczania bezrobocia jest polityka rynku pracy realizowana w ramach aktywnych i pasywnych programów finansowanych z Funduszu Pracy. Rola programów sprowadza się do aktywizacji osób bezrobotnych, promocji zatrudnienia i działań osłonowych. Wysokie koszty realizacji owej polityki sprawiają jednak, że od lat staje się ona przedmiotem ostrej krytyki, która często podważa sens jej stosowania. Podstawowym problemem, jaki pojawia się w analizie roli programów, jest relacja udziału wydatków na aktywne formy przeciwdziałania bezrobociu do ogółu wydatków przeznaczonych na politykę. Fundusz Pracy od początku swojej działalności był uważany bowiem głównie za fundusz pasywny, z którego są finansowane w zasadzie osłony dla osób pozostających bez pracy. Przez 19 lat pochłonęły one 3/4 środków przeznaczonych na realizację wszystkich działań. Dopiero w ostatnich czterech latach możemy obserwować ewolucję podejścia do realizacji programów rynku pracy i zmiany w strukturze wydatków na ten cel.

Zasadne wydaje się przedstawienie poziomu i struktury wydatków z Funduszu Pracy od początku jego funkcjonowania (1990–2008) w celu ukazania zmian zarówno w poziomie, jak i samej strukturze wydatków Funduszu Pracy na aktywne i pasywne programy rynku pracy. Interesujące wydaje się również przedstawienie zależności między zmianami w strukturze wydatków Funduszu Pracy a poziomem bezrobocia.

Introduction

Painful social consequences (AULEYTNER, GŁĄBICKA 2001, pp. 40–41) as well as lasting and mass character of unemployment allow considering that phenomenon as representing one of the major social issues. It has become the basic challenge for the social policy (FIRLIT-FESNAK, SZYLKO-SKOCZNY 2007, p. 225), which performs its tasks in the area of combating unemployment through the labor market policy (WIŚNIEWSKI 1994, pp. 29–30).

In Poland, similar to other countries, both passive and active instruments are applied within the frameworks of the labor market policy. Those earlier ones reflect the commitments of the State to the people without work. They are of compulsory character and do not influence the scope of unemployment directly. The later ones, that is the active instruments serve limiting unemployment (Kłosiewicz-Górecka 2008, p. 135). In the subject literature it is highlighted that the role of such instruments should involve, first of all (KWIATKOWSKI 1998, p. 9):

– professional activation of the unemployed through active labor market programs,

– decreasing the structural mismatch in the labor market,

– influencing the scope of employment and level of unemployment.

As a consequence, the active labor market policy instruments are focused mainly on the preparation of the unemployed for the first or consecutive inclusion in the process of work while the passive ones fulfill the mitigating-social function only (KABAJ 2004, p.148).

Active labor market policy should, as a consequence, improve the functioning of that market by decreasing the extent of unemployment and influencing

an increase in demand for work (ORGANIŚCIAK-KRZYKOWSKA 2005, p. 255). Activities in the area of promotion of employment, mitigating the consequences of unemployment and professional activation require long-term measures the effectiveness of which depends not only on the innovative ideas but also on the adequate funding.

The Labor Fund, established in 1990, is the foundation for operation of both active and passive labor market instruments in Poland. In its nature, it is a special purpose fund the revenues of which originate from contributions of employers, State budget and European Union subsidies, credit and loans as well as other sources. A significant part of the measures within the frameworks of the labor market policy, i.e. the compulsory social benefits for the unemployed and the optional expenditures for financing the active labor market programs are funded from the Labor Fund (FIRLIT-FESNAK, SZYLKO-SKOCZNY 2007, p. 227).

High labor market policy implementation costs, nevertheless, cause that for years it has been the subject of fierce criticism that frequently questions the sense of its application (WIŚNIEWSKI 2002, p. 326). It happens that those opposed to the State activity in the labor market motion for allocating the funds financing the labor market policy to creating jobs only. They are against the mitigating function of the labor market instruments that consumes a significant part of the funds of the Fund. The Labor Fund, since the beginning of its operation, has been considered mainly as a passive fund from which the mitigation measures for the unemployed have been funded. However, during the recent years, an evolution in the approach to implementation of the labor market policy has taken place, which involves a gradual resignation from the mitigation measures towards strengthening the instruments of professional activation of the unemployed.

That is why the main goal of the paper is to present the level and structure of expenditures from the Labor Fund on implementation of the main labor market policy assumptions during the years 1990–2008, that is from the beginning of the Fund. Presentation of the evolution in the approach to the implementation of active labor market instruments, including individual programs, is a particularly important part of the paper. Additionally, presentation of the correlation between the changes in the Labor Fund expenditures structure and the level of unemployment seems interesting.

Level and structure of Labor Fund expenditures during the years 1990–2008

Expenditures on the active forms of preventing unemployment in the EU represented ca. 42% of the total expenditures (ca. 1% GDP) (WIŚNIEWSKI 2006,

p. 577). In Poland such expenditures were much lower, which surely resulted from continually high unemployment and limited financial potential. During the decade of the operation of the Labor Fund (i.e. during the years 1990–2008), the total expenditures from the Fund amounted PLN 110.8 billion, including:

– PLN 81.7 billion – on dole and benefits for the unemployed,

– PLN 24.0 billion – on funding the active forms of preventing unemployment,

– PLN 5.1 billion – on funding of other tasks.

The share of the individual categories of expenditures is presented in Figure 1.

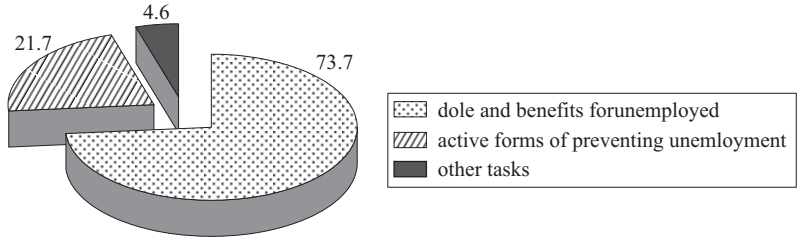

Fig. 1. Expenditures of the Labor Fund during the years 1990–2008 [%]
Source: own work based on the data from: *Informacja o aktywnych formach* (2006) i *Informacja o realizacji programów...* (2008)

Passive forms of preventing unemployment were the largest item of expenditures in the operations of the Labor Fund up to now. Their share in the total expenditures was 73.7%. This means that in practical terms 3/4 of the funds allocated for labor market policy implementation the major objective of which is to improve the labor market operation and decreasing unemployment, were disbursed as benefits securing social safety only. The dole and benefits are compulsory payments, which in practical terms means that their numbers are not limited and actually they have priority over the expenditures on the active instruments. That is why the outlays so far incurred on active forms of preventing unemployment are relatively modest representing just ca. 22% of all the funds. This is a significant limitation to their effectiveness.

Additionally, analyzing the detailed structure of the Labor Fund expenditures in Poland during the last ten years it can be noticed clearly that both the amounts and the percentage share of the individual expenditures reached highly diversified levels (Fig. 2).

Analyzing the individual expenditures of the Labor Fund during the years 1990–2008 it should be noticed that despite the decreasing trend, every year

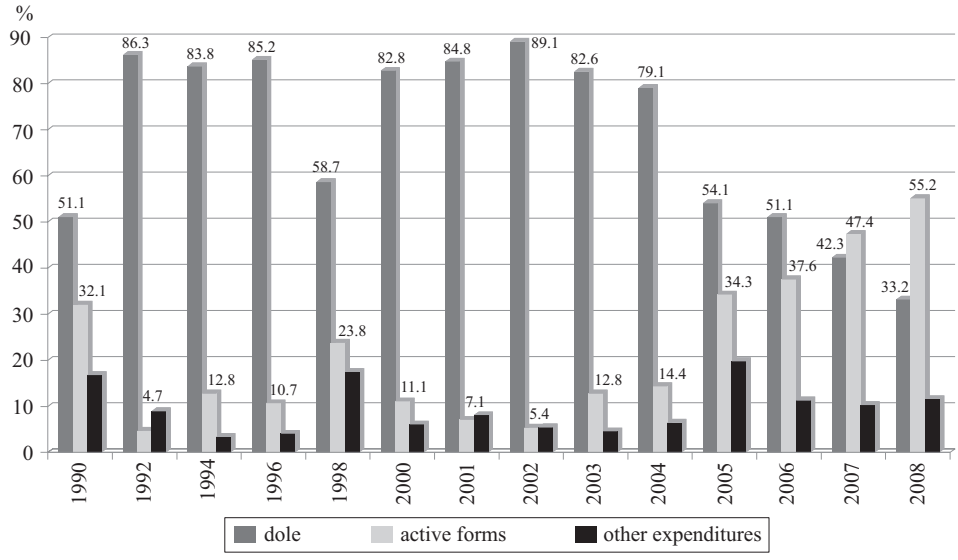

Fig. 2. Structure of Labor Fund expenditures in Poland during the years 1990–2008
Source: own work based on the data of the Department of Funds of the Ministry of Labor and Social Policy (MPiPS)

until 2007, the expenditures on the dole for the unemployed always had the highest share (in 1990 it was 51.1% of the total amount, in 2002 as much as 89.1%). During that time the outlays on the active forms of combating unemployment were almost symbolic (in 1992 and in 2002 they represented only 4.7% and 5.4% of the total expenditures). Nevertheless it should be remembered that such a high share of the dole in the structure of the Labor Fund expenditures until 2005 resulted also from the fact that the Fund financed not only the dole but also a part of the expenditures for the pre-retirement benefits. Only in 2005, the servicing of pre-retirement benefits was moved to the Social Insurance Institution, which limited the total expenditures of the Labor Fund from PLN 9,180.2 mln in 2004 to PLN 6,550.8 mln in 2005.

For the first time in the history of the Labor Fund the share of expenditures on the active labor market instruments exceeded the volume of expenditures on the dole and benefits for the unemployed in 2007 (Fig. 2). It reached 47.4% (PLN 2,544.6 mln) of the total expenditures as compared to 42.3% (PLN 2,267.8 mln) allocated to the passive measures. That change in the attitude to the labor market policy implementation resulted from full scope inclusion in the implementation of the *Lisbon Strategy,* and in particular the *European Employment Strategy* as a consequence of Poland's accession to the European

Union, resulting in the Act on promotion of employment and labor market institutions (Dz.U. of 2004 No. 99, item 1001). The main goal of the legislators was to introduce a more flexible approach to employment and to facilitate finding a job by people in a particularly difficult situation, mainly through development of active labor market policies. It soon found reflection in the structure of the Labor Fund expenditures. The share of outlays for active labor market instruments increased from 14.4% to 34,3% within 2005. During that year not only a jump increase in the outlays on activation programs (Fig. 2) but also a radical change in their structure (Fig. 3) occurred.

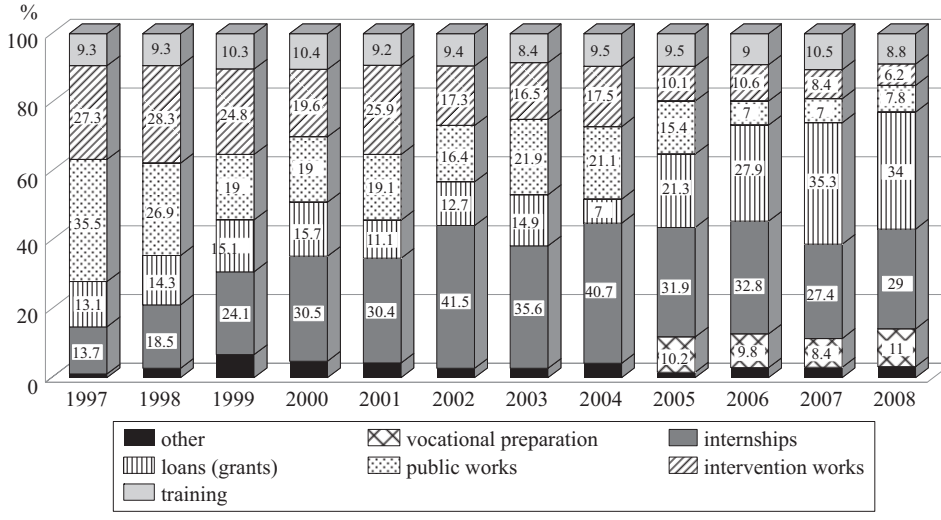

Fig. 3. Structure of outlays on active labor market programs during the years 1997–2008 [%]
Source: own work based on the data from: *Informacja o aktywnych formach* (2006) i *Informacja o realizacji programów...* (2008)

During the last 11 years, i.e. 1997–2008, the change taking place in the structure of outlays allocated to active labor market programs can be observed clearly. In 1997, expenditures related to public works and intervention works programs had the highest share in the outlays for activation of the unemployed, which jointly represented over 60% of funds allocated for that purpose. The lowest level of financing was provided for loans/grants originated to the unemployed to start own business and to the internships (ca. 13% of funds each). Subsidized employment in the form of intervention or public works during the consecutive years decreased year after year, which resulted mainly from the gradual resignation from those forms of activation. At the same time, starting as of 2005, the interest of the unemployed in obtaining funds for

start-up of own business activities increased significantly. The same concerned an increase in the knowledge of employers on employing the unemployed in exchange for the refund of the costs or equipment or upgrading the workstations for the unemployed employed. Also such forms of activation as training and internships enjoyed vast interest among the unemployed.

The structure of expenditures on active labor market instruments in 2008 was completely opposite to that of 1997. In this case the funds allocated to refunding to the employers the costs of equipment or upgrading the workstations for the unemployed posted at those workstations and grants (non-reimbursable) originated to the unemployed to start own business activity (representing ca. 34% of the expenditures) as well as internships for graduates (29%) had the largest share in the outlays. Initiatives such as intervention or public works were financed to a smaller extent.

The scope of application of the individual activation tools depends significantly on the interest among the unemployed, the organizational capacity concerning a given form at the local labor market and the preferences of the county territorial governments. That choice, however, should depend in particular on the cost effectiveness measured by the costs of re-employment (see SZYLKO-SKOCZNY 2004, p. 191) and employment measured by the proportion of people that became employed after completing their participation in the program (see ORGANIŚCIAK-KRZYKOWSKA 2005) as those are important measures of the active labor market policy development.

Expenditures on active labor market forms and the unemployment level

Active labor market policy means mainly undertaking of measures focused on improvement in that market. The outlays allocated to implementation of active labor market programs are to contribute mainly to limiting unemployment of both frictional and structural type resulting from the insufficient demand.

Increase in the expenditures on the active labor market programs that occurred during the recent years should, as a consequence, translate into the increased number of people withdrawn from the registers as a consequence of covering them with active forms of preventing unemployment. That correlation is illustrated by Figure 4.

Increasing the funds from the Labor Fund allocated to financing of active programs for preventing unemployment was one of the factors that could contribute to a decrease in the level of unemployment during the recent years. That fact is clearly noticeable in the presentation of changes in the expendi-

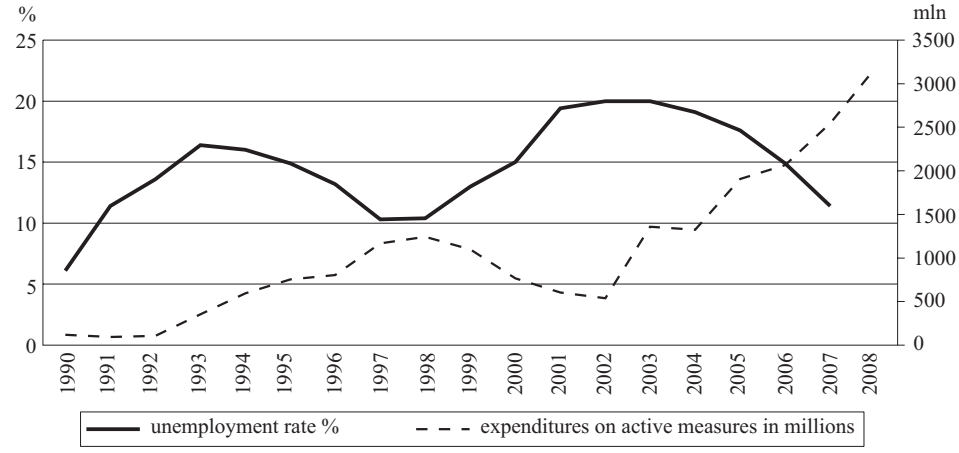

Fig. 4. Expenditures on active employment prevention forms and the unemployment rate during the years 1990–2008

Source: own work based on the data by the MpiPS (data on unemployment and revenues and expenditures of the Labor Fund during the years 1990 – 2004, http://www.mpips.gov.pl/–download.php?f=userfiles%2FFile%2Frynekpracystatystyki%2Fdanefp.doc., [access on 23.06.2009] and *Informacja o realizacji programów...* (2008)

tures on the active forms and changes in the unemployment rate. The situation observed during the years 1999–2002 can serve as an example. The amount of the Labor Fund funds allocated to the active forms decreased year after year while at the same time a significant increase in the level of unemployment occurred. On the other hand the increase of outlays as of 2003 was accompanied by an improvement in the situation in the labor market. This seems to confirm the thesis concerning existence of correlation between a decrease of unemployment and increase of outlays on active labor market programs. The increase of financial outlays for those forms of preventing unemployment influences both an increase in the number of subsidized jobs offers and the largest outflow of the unemployed resulting from taking subsidized employment and commencement of trainings, internships or vocational preparation at workstations.

As a consequence, increasing the outlays on active forms of the labor market policy had to result also in the increase in funds for activation of the unemployed per 1 registered unemployed person, which in turn surely translated into the effectiveness of the implemented programs (Fig. 5) that was high during the recent years.

As of 2004, we can talk about a clear increase in the funds allocated for active labor market instruments. As of that year the continual increase in the amount allocated for activation of 1 unemployed person was observed. Until

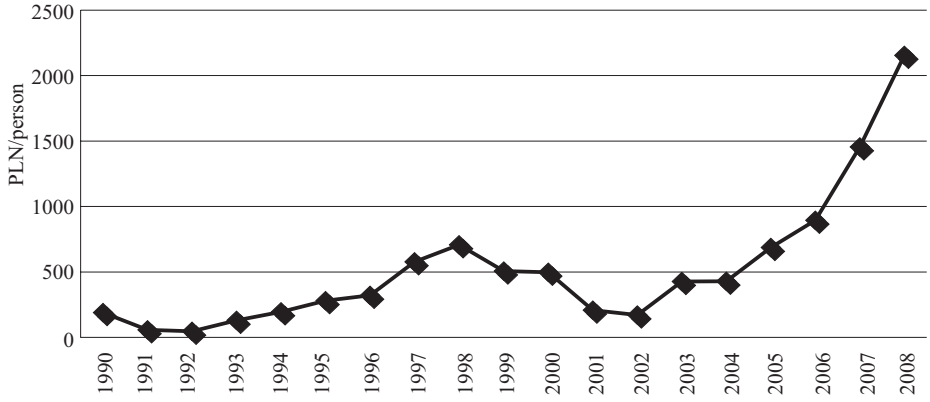

Fig. 5. Expenditures on active labor market instruments per 1 registered unemployed during the years 1990–2008

Source: own work based on the data by the MpiPS (data on unemployment and revenues and expenditures of the Labor Fund during the years 1990– 2004, http://www.mpips.gov.pl/_download.php?f=userfiles%2FFile%2Frynekpracystatystyki%2Fdanefp.doc., [access on 23.06.2009], *Informacja o realizacji programów aktywnego...* (2008) and *Informacja o aktywnych formach...* 2006.

Poland's accession to the European Union that amount rarely exceeded PLN 500 while in 2008 the average amount spent per 1 unemployed exceeded PLN 2000. It should also be remembered that not all the unemployed are interested in benefiting from any form of activation.

Conclusions

As of 1990, the labor market policy goals that are elements of the Polish model of combating unemployment have been implemented by means of active and passive programs. The Labor Fund is responsible for the funding of the implemented policies. During the initial 15 years the expenditures for the so-called passive labor market instruments dominated the labor market policy. During the initial 15 years of systemic transformation the attempts were made to decrease the level of unemployment mainly by means of decreasing the supply of labor (role of benefits and pre-retirement benefits). Additionally, all the activities within the frameworks of the labor market policy should be considered mitigating activities that did not activate the beneficiaries in any way, or rather deactivated them.

Although during the consecutive years the level of social protection decreased gradually the general "philosophy of support" did not change. As the result, almost 3/4 of funds allocated for implementation of the labor market policy assumptions were passed to the beneficiaries as the dole and other

benefits. The remaining part activated the unemployed within the frameworks of the active forms/programs that during the past years were subject to major development and gradual transformation. During the initial period the structure of funds allocated for that group of programs should also be considered defective. Definitely ineffective programs such as public works consumed the vast majority of funds. On the other hand the training or loans, effective although costly, consumed just a marginal part of the budget. Nevertheless the share of funds for professional activation of graduates increased systematically.

The breakthrough for labor market policy implementation came with the accession of Poland to the European Union structures and the Act in which the strategic goals of the current labor market policy in the area of professional activation of the unemployed were defined anew. This, however, required a major change in both the level and structure of the Labor Fund outlays on the active programs. Gradually, the volume of those outlays started exceeding the outlays on funding the benefits disbursed. Additionally the effectiveness index of the implemented active labor market programs allowed evaluation of their effectiveness and focusing the funds on those that were the most effective for employment and costs. They with no doubt include grants to the unemployed for establishing own businesses, refunds for upgrading workstations and intervention works. It is important to carry out permanent evaluation of effectiveness of the labor market programs because it determines the effectiveness of the use of public funds allocated for limiting unemployment.

Additionally, the increase in outlays on active labor market programs translates into the decrease in the unemployment level. As a result the effectiveness of work of the employees increases. That effectiveness in turn means performance of tasks involved in professional activation of the unemployed. It should not be forgotten, however, that the decrease in the level of unemployment during the recent years occurred during the economic boom that had a beneficial influence on the scope of unemployment. The scale of economic emigration is also of importance in that respect.

Undoubtedly the economic boom and the resulting improvement in the labor market situation until recently offered a major opportunity to intensify the activities activating the unemployed. That was also supported by decreasing the pressure on applying the passive labor market instruments. Currently, the labor market policy is facing another challenge of the consequences of the financial crisis in the shrinking labor market. The real challenge is to mitigate the influence of the crisis on employment.

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EFFECTS OF CHANGES IN FOREIGN EXCHANGE RATES IN INTERNATIONAL ACCOUNTING STANDARDS AND IN POLISH ACCOUNTING REGULATIONS

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K e y w o r d s: exchange differences, international accounting standards, accounting act.

A b s t r a c t

This paper tackles the problem of exchange differences in International Accounting Standards and in the Polish Accounting Act. It presents a brief history of standardization in accounting and describes regulations that oblige economic entities to comply with the international standards. The main part of the article focuses on differences regarding the general approach of the Accounting Act compared to the IAS. It takes into scrutiny issues regarding the recognition of exchange differences and presents the use of specific exchange rates during the process of translation.

RÓŻNICE KURSOWE W MIĘDZYNARODOWYCH STANDARDACH RACHUNKOWOŚCI I W USTAWODAWSTWIE POLSKIM

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S ł o w a k l u c z o w e: różnice kursowe, Międzynarodowe Standardy Rachunkowości, ustawa o rachunkowości.

A b s t r a k t

W artykule poruszono problem różnic kursowych w Międzynarodowych Standardach Rachunkowości i w polskiej ustawie o rachunkowości. Zarysowuje historię standaryzacji w rachunkowości. Opisuje wymogi dotyczące stosowania międzynarodowych standardów. Główna część artykułu skupia się na opisaniu różnic w podejściu do tematu różnic kursowych ustawy o rachunkowości i MSR. Rozważano kwestie uznawania różnic kursowych i prezentuje stosowanie różnych kursów walutowych do przeliczeń.

Introduction and the aim of search

The article concerns the exchange rate differences in International Accounting Standards, mainly in IAS 21 "Effects of Changes in Foreign Exchange Rates" and in the Polish Accounting Act. This issue has been tackled by few authors since the amendment of the Polish Accounting Act in the year 2008 and was treated in a general way. The aim of this article is to explain the discrepancies between the IAS and the Polish Accounting Act in the case of exchange differences. The main goal is to present the most significant differences between the Accounting Act and the IAS such as the problem of the approach of the Polish law and international regulations towards this issue and the problem of recognition of exchange differences.

Methodology of studies

The research method consisted of studying the literature on the subject of exchange differences. The study mainly focuses on the text of the Polish Accounting Act before and after the amendment dated on 18th March 2008 and IAS 21 "Effects of changes of the exchange rates". Corresponding paragraphs have been compared in the view of the effects for business entities. The obtained discrepancies are described and presented in a table.

Standardization in Accounting

Easy access to reliable and credible information during the times of increasing global convergence and acceleration of the process of tightening ties between international economic entities is of vital importance when economic decisions are being taken. Information included in financial statements is indispensable in the analysis of the financial situation of business entities. Therefore, it should be subject to common and unified rules regardless where it has been prepared (TURYNA 2003, p. 18).

Standardization in the international and regional scale leads to increasing comparability and clarity of financial statements owning to common assumptions, standards, and concepts with, nevertheless, a certain amount of flexibility left. Intensive promotion of unified standards and the beginning of their application commenced when the International Accounting Standards Committee (IASC) has been founded in June 1973 in London (JARUGA 2002, p. 3). IASC was started by chartered accountans' organizations from Australia, Canada, France, Germany, Japan, Mexico, Holland, Great Britain, United States and Ireland (CEBROWSKA 2007, p. 133).

From 1973 to 2002 the IASC developed and published nearly 40 standards and 24 interpretations dedicated to various issues of accountancy and financial reporting (TURYNA 2003, p. 10). In 2001 IASC has been restructured and transformed into International Accounting Standards Board – IASB (CEBROWSKA 2007, p. 133). The headquarters have been moved from London to Delaware US. The new organization assumed the responsibilities of its predecessor.

Obligation of using the IAS

The obligation of using International Accounting Standards varies between countries. In Poland the Polish Accounting Act is superior towards National Accounting Standards and International Accounting Standards, however in matters not regulated by the Accounting Act it is possible to use International Accounting Standards. However, it should be remarked that many countries have adopted the IAS as national accounting standards.

The IAS are used:

– as the basis of national requirements of accountancy in many countries.

– by the stock exchange – the IAS are used to prepare financial statements by national companies and companies from abroad.

– by international organizations (OLCHOWICZ, TŁACZAŁA 2004, p. 15).

According to the requirements of the European Commission, all EU companies that are listed on the stock exchange have been obliged to prepare their financial statements according to the IAS since 2005. However, in the case of companies that are not listed on the stock exchange, the decision whether to prepare the financial statement according to the IAS lies within the competence of national law (CEBROWSKA 2007, p. 134).

According to article 55 of the Accounting Act, banks and entities operating in the European Economic Area are obliged to use the IAS. Entities which are forming a capital group in which the dominating entity prepares the consolidated financial statement according to the IAS and entities that plan to issue securities are allowed to use the IAS. However, when an entity is on the regulated market of the EEA it is obliged to prepare its financial statement according to the rules presented in the IAS. Furthermore, the manger of the entity should take into account the fact that a financial statement prepared according to the IAS is submitted to an obligatory audit.

Exchange differences in the IAS

IAS 21 "Effects of Changes in Foreign Exchange Rates" regulates the exchange differences. However, some rules are also listed in IAS 23

regarding costs of external financing and in IAS 12 regarding the deferred tax asset. Exchange rates connected with securities are regulated by IAS 38.

IAS 21 regulates the ways of evaluation and presentation of assets and liabilities in foreign currency and procedures of translating the transactions expressed in foreign currency (JARUGA 2004, p. 167).

The standard should be used when:

a) recognizing in the financial books transactions made in foreign currencies.

b) translating financial statements of entities performing business activities abroad which are included in the financial statement of the dominating entities in full or in proportional consolidation method or in the equity method.

c) translating results and balances to the presentation currency.

The standard presents a division into functional and presentation currency. The functional currency meets the following criteria:

– it strongly influences the prices of goods and services.

– it is the currency of the country which economic environment and regulations strongly influence the prices of goods and services.

– it influences in the strongest way the costs of labor, materials and other costs connected with sold goods and services (HELIN 2006, p. 350).

Whereas the presentation currency is the currency in which the financial statement is published.

Differences between the approach of the IAS and the Polish Accounting Act to exchange differences

Transactions in foreign currencies are translated to Polish Zloty at various moments and in different goals. The rules of translation are set in the Polish law in the Accounting Act, in the Corporate Income Tax Act, in the VAT regulations and in the international regulations set in the IAS. Given the fact that these rules were designed for different purposes there are some differences between them (RUDNICKA 2005).

In the case of exchange differences it is important to notice that the IAS 21 has been designed to allow recognizing transactions in foreign currencies and translating financial statements of entities operating abroad. The recommendations expressed in the standard are sometimes rather general, which is motivated by the fact that the standard should be universal. The Accounting Act regulates the issues of exchange differences in much greater detail (JARUGA 2004, p. 167).

The major difference between the IAS and the Polish Accounting Act is that according to the IAS a financial statement should be done in the presentation

currency which is not necessarily the currency of the country in which the entity has its headquarters. The Polish Accounting Act demands financial statements to be done in the Polish language and in Polish Zloty (HELIN 2006, p. 353).

Furthermore, it can be said that the IAS are more flexible regarding the type of exchange rate to be used in the translation. According to the standard foreign transactions should be shown in the functional currency according to the exchange rate valid for the day of the transaction, which is usually the spot exchange rate. Yet, the standard allows, due to practical reasons, the use of average exchange rates if the average exchange rate can be considered as reliable (JARUGA 2004, p. 167).

However, the article 30.2 of the Accounting Act states that transactions in foreign currencies should be recognized on the same day that they have taken place at the exchange rate that was used, or the average exchange rate announced by the National Bank of Poland for the day preceding the transaction (if other regulations regarding means coming from the EU budget or from other countries of the EEA do not state otherwise).

The IAS 21 offers greater flexibility in the case of choosing the exchange rate. It is important to note that the average exchange rate can only be used if it is not subject to great variations. Furthermore, the rules regarding the translation of liabilities and assets are different than those set forth in the Accounting Act.

International regulations introduce the division into monetary items, non-monetary items carried at historical cost and non-monetary items carried at fair value. Foreign currency monetary amounts should be reported using the closing rate. Yet, there are no exchange differences on non-monetary items carried at historical cost, because the same exchange rate is used on the day of the transaction and the balance sheet day. Non-monetary items carried at fair value should be reported at the rate that existed when the fair values were determined, therefore exchange differences may appear (JARUGA 2004, p. 171).

Another element that causes differences between financial statements prepared according to the International Financial Reporting Standards and financial statements subject to the Polish Accounting Act is the definition of monetary items in the standard which "are units of currency held and assets and liabilities to be received or paid in a fixed or determinable number of units of currency" (IAS 21.8). In the view of the Accounting Act, long term investments can be treated as monetary amounts. Exchange differences resulting from transactions on long terms investments are recognized directly in equity (GABRUSEWICZ, SAMELAK 2006, p. 58), the IAS requires the exchange differences to be reported in profit or loss in the period.

In the case of exchange differences regarding investment property carried at fair value according to the IAS 40 the entity reports the changes of fair value

in costs and losses of the given period. The Accounting Act however requires the exchange differences to be recognized in equity (JARUGA 2004, p. 174).

Recognition of exchange differences in assets is another issue. According to the Accounting Act, art 28(4), the entity, in circumstances justified by necessary, long-term preparation of goods for resale or a finished product for sale or by the long-term manufacture of a finished product, the cost of acquisition or manufacture may be increased by the cost of servicing liabilities incurred to finance the inventories of goods for resale or finished products over the period of their preparation for sale or manufacturing and by related foreign exchange differences, less related revenue. The International Accounting Standards advise that only a reasonable part of the exchange differences can be recognized into the value of property, plant or equipment under construction, intangible assets, goods for resale or finished products (IAS 23.12). This means that a part of the exchange differences may not be included in the financial result of the given period.

Another difference between Polish and international regulations is the fact that IAS 21 uses simplified methods of translation of financial statements of entities operating abroad. According to Polish regulations, an entity that has departments abroad which prepare their proper financial statements, prepares its financial statement in the following way:

– the balance sheet in foreign currency should be translated using the average exchange rate announced by the Bank of Poland for the balance day.

– profit and loss account statement should be translated using the exchange rate being an arithmetical mean of average exchange rates for every last day of financial months. In justified cases the exchange rate being an arithmetical mean of the balance sheet day and the former balance day average exchange rate can be used. (HELIN 2006, p.353).

Comparison of Polish regulations and the IAS for exchange differences

Table 1

Comparison of Polish regulations and the IAS for exchange differences

Accounting Act	IAS
1	2
Books of accounts shall be kept in the Polish language and currency (art. 9).	IAS 21 introduces a division into: – functional currency – the currency of the primary economic environment in which the entity operates and presentation currency – the currency in which the financial statements are presented (IAS 21.8).

cont. table 1

1	2
Foreign currency transactions shall be recorded on initial recognitions, (if other regulations regarding the means from the European Union's budget or from other countries from the European Economic Area, and non-refundable means from foreign sources do not state otherwise) by applying to the foreign currency amount the 1. the exchange rate that has actually been used, taking into account the character of the operation – sale or purchase of currency, payment of receivables or liabilities 2. the average exchange rate of the National Bank of Poland for the day preceding the day of the transaction, if using the exchange rate in point 1. is not justified (art. 30.2)	A foreign currency transaction shall be recorded, on initial recognition in the functional currency, by applying to the foreign currency amount the spot exchange rate between the functional currency and the foreign currency at the date of the transaction (IAS 21.21).
1. Not rarer than for the balance sheet day: 1) assets in foreign currencies (not including the shares in subordinated business branches valuated at the equity method) and liabilities at the average exchange rate announced by the National Bank of Poland. 2) cash in the units dealing in foreign currency at the exchange rate that was used when the currency has been bought unless the exchange rate is higher than the exchange rate announced by the National Bank of Poland (art. 30.1)	At the end of each reporting period: (a) foreign currency monetary items shall be translated using the closing rate; (b) non-monetary items that are measured in terms of historical cost in a foreign currency shall be translated using the exchange rate at the date of the transaction; and (c) non-monetary items that are measured at fair value in a foreign currency shall be translated using the exchange rates at the date when the fair value was determined (IAS 21.23).
Incomes and expenses resulting from exchange differences are recognized in the income statement with exception of – differences from revaluation of long-term investments which are recognized in supplementary or similar capital. – exchange differences resulting from liabilities financing elements of the assets, which are capitalized in the production cost or the cost of acquisition (art. 30.4).	
The cost of acquisition or manufacture of items of property, plant or equipment under construction, items of property, plant and equipment and intangible assets, is comprised of all the costs which an entity incurred for the period of construction, assembly, preparation and improvement, until the balance sheet date or the date of commissioning the assets for use, including also the costs of servicing liabilities incurred to finance them and related foreign exchange differences, less related revenue (art. 28.8.2). In justified situations, long preparation of products or goods or a long production process, the acquisition price or the cost of manufacture can	Exchange differences arising from foreign currency borrowings to the extent that they are regarded as an adjustment to interest costs (IAS 23.6.e).

cont. table 1

1	2
be increased by the cost of servicing the liabilities incurred to finance the preparation process and the resulting exchange differences, less related revenue.	
All positions denominated in foreign currency in the financial statement of the foreign branch are translated into Polish currency at the average exchange rate announced by the National Bank of Poland for the day of gaining control of the foreign branch.	The assets and liabilities in foreign currency of the entity being taken over are to be translated by applying to the foreign currency amount the spot exchange rate between the functional currency and the foreign currency at the date of the transaction (IAS 21.21).
The financial statements of an entity having branches abroad (business units) which prepare their financial statements abroad, shall include relevant data of these branches denominated in foreign currency and translated into the Polish currency at the average exchange rate as at a given balance sheet date set for a given currency by the National Bank of Poland, whereas the profit and loss account data shall be translated at an exchange rate being an arithmetical mean of average exchange rates as at the last day of each month of the financial year and in justified cases at the average exchange rate being an arithmetical mean of average exchange rates as at the last day of the prior financial year and the last day of the current financial year (art 51.2).	The results and financial position of an entity for every following balance sheet day should be translated according to the following rules: – assets and liabilities for each statement of financial position presented (ie including comparatives) shall be translated at the closing rate at the date of that statement of financial position; – income and expenses for each statement of comprehensive income or separate income statement presented (ie including comparatives) shall be translated at exchange rates at the dates of the transactions however, an average exchange rate can be used. (IAS 21.39, 40).
The exchange differences that result from these transactions shall be presented in the aggregated financial statements as "currency translation differences" being a separate item of revaluation reserve in equity (art. 51.2).	All resulting exchange differences shall be recognized in other comprehensive income (IAS 21.39 c).
If shares in a co-subsidiary were disposed of during the financial year the exchange differences are recognized in the consolidated loss and profit account (art. 61.8).	On the disposal of a foreign operation, the cumulative amount of the exchange differences relating to that foreign operation, recognized in other comprehensive income and accumulated in the separate component of equity, shall be reclassified from equity to profit or loss (as a reclassification adjustment) when the gain or loss on disposal is recognized (IAS 21.48).

Source: IAS 21, IAS 23, and HELIN, 2006, 26–70.

Conclusion

The establishment of ISAB and the creation of IFRS and IAS is of vital importance to business entities as it allows for a greater transparency of financial statements prepared in different countries.

It is important to note the fact that international regulations are more

flexible than the Polish ones. This simplifies the process of preparing financial statements, as it allows the business entities to use the most efficient methods of calculating the exchange differences so that the financial statement may represent the actual situation of the company in the best possible way.

However, the lack of explicit directives creates a gap for some deliberate and non-deliberate misinterpretations. It could even mean that different financial statements (correct in the view of the IAS) may be prepared for the same business entity depending on the assumptions used. The determination of the extent of this problem would demand a research of a greater scope.

It can be clearly stated that the discrepancies between the international standards and the Polish Accounting Act, in the case of exchange differences, are significant because the IAS is using a different approach which focuses on issues like the presentation and functional currency and the division into monetary and non-monetary items. The Accounting Act mainly concentrates on the types of exchange rates to be used during the translations. Again this means that financial statements prepared according to the Accounting Act and the IAS may differ in the case of exchange differences.

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THE IMPLEMENTATION OF THE CONCEPT OF CORPORATE SOCIAL RESPONSIBILITY IN POLISH ENTERPRISES

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Key words: corporate social responsibility, sustainable development, business ethics.

Abstract

The idea of Corporate Social Responsibility, including its various practical aspects, is a relatively new concept, systematically becoming more and more popular in EU-27 because of potential economic, environmental and social benefits which it can bring. Areas that seem worth focusing from the point of view of possible competitive gains from CSR, concern good relations with both internal and external stakeholders. The ability to build proper relations helps to increase profits, reduce costs or enhance image, loyalty and trust among stakeholders which seems to be decisive for long term competitiveness of given enterprise or the whole economy.

The paper investigates the implementation of concept of CSR in Polish economy. The author presents the examples of socially responsible firms and good practice which are undertaken in the analyzed area. Unfortunately, in case of many small and medium enterprises CSR still remains a peripheral concern. The importance of CSR cannot be underestimated in case of the whole Polish economy that aspires to be as competitive as the other Western EU countries.

IMPLEMENTACJA KONCEPCJI SPOŁECZNEJ ODPOWIEDZIALNOŚCI BIZNESU W POLSKICH PRZEDSIĘBIORSTWACH

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Słowa kluczowe: społeczna odpowiedzialność biznesu, zrównoważony rozwój, etyka biznesu.

Abstrakt

Idea społecznej odpowiedzialności (*Corporate Social Responsibility* – CSR), wraz z różnymi sposobami jej realizacji, stanowi relatywnie nową koncepcję, zyskującą systematycznie na popularności ze względu na potencjalne ekonomiczne, ekologiczne i społeczne korzyści jakie ze sobą niesie.

Obszary szczególnie godne zainteresowania, z punktu widzenia konkurencyjnych korzyści związanych z CSR, obejmują relacje z wewnętrznymi i zewnętrznymi interesariuszami. Od umiejętności zbudowania prawidłowych relacji z różnymi grupami interesariuszy zależy wysokość osiąganych zysków, wizerunek, lojalność oraz poziom zaufania wobec przedsiębiorstwa, co okazuje się przesądzać o konkurencyjności firmy, a zarazem gospodarki narodowej jako całości w perspektywie długiego okresu.

Celem artykułu jest przedstawienie implementacji koncepcji społecznej odpowiedzialności biznesu w polskich przedsiębiorstwach przez pokazanie przykładów dobrych praktyk podejmowanych w tym zakresie. Niestety, w przypadku małych i średnich przedsiębiorstw koncepcja CSR wydaje się wciąż odgrywać drugorzędną rolę. Jednak nie może być bagatelizowana w odniesieniu do polskiej gospodarki, która aspiruje ku temu, aby stać się co najmniej tak konkurencyjna, jak większość gospodarek 15-EU.

Introduction

A concept of corporate social responsibility seems to be getting more and more important, especially in the context of existing global problems of environmental and social nature. It means a completely new business approach, intrinsically linked to the concept of sustainable development, which puts stakeholders expectations and the principle of continuous improvement and innovation at the heart of business strategy. According to the European Commissioner G. Verheugen, *CSR can promote and defend European values and contribute to strategic EU policy goals, in particular the promoting of sustainable growth and providing more and better jobs. As the goals of competitiveness, sustainability and social inclusion rapidly converge, CSR becomes a more important part of the competitiveness equation for individual enterprises and for the EU itself.*

The main purpose of this paper is to show the existence of CSR idea in Polish companies through presenting the examples of good practices and initiatives undertaken in this area which are perceived as a result of economic, social, political and cultural changes taking place in the contemporary society. Because EU as a whole must find ways to combine competitiveness with social and environmental sustainability, greater attention to social and environmental issues, and better cooperation with other stakeholders, are also undoubtedly required in case of Polish economy.

The idea of corporate social responsibility

A development of the idea of corporate social responsibility is a consequence of permanent discussions on the ethical aspects related to business activity, which have been run since the end of the XIX century. The concept of CSR was particularly developed in the 60s of the XX century, but nowadays it

is worth underlying that the idea of CSR is growing in importance again, especially in the European Union countries. Primarily, it was thought that economic growth is a source of economic and social development, appearing as a result of a strive for profit maximization under the conditions of fair competition between enterprises. However, as times went by, that prevailing economic theory, originating from classical economics, seemed to be unrealistic in its basic assumptions because of imperfections of market mechanism. It turned out that when economic actors concentrate exclusively on profit maximization, it simultaneously causes many side effects, such as social inequality, unemployment, environmental pollution or monopolization. That is why the traditional aims of firms should be undoubtedly extended to the social and ecological aspects, which influences the realization of the idea of corporate social responsibility. CSR can be defined in different ways, because there is no single, commonly accepted definition of that concept. In accordance with the opinion of many authors CSR is about how companies manage the business processes to produce overall positive impact on society. It is compatible with the view of Ludwig Erhard, commonly known as one of the main fathers of the concept of social market economy. In his book "Common prosperity" he directly stated that the social essence of market economy is based on the fact that every economic success, no matter where obtained, every case of progress in efficiency, every case of progress in labour productivity should serve society as a whole. HOLME and WATTS (2000) said that it is the continuing business commitment to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large. In accordance with the definition of organization called Business Social Responsibility, CSR means achieving commercial success in ways that honor ethical values and respect people, communities and the natural environment (WHITE 2006, p. 6).

The main function of the enterprise is to create value through producing goods and services that society demands, thereby generating profit for its owners and shareholders as well as welfare for society. Nowadays, it becomes obvious that reaching that aim in longer perspective without obeying ethical standards seems to be unattainable. In accordance with a modern approach enterprise is not only perceived as a production and trading entity but also as a social entity. That is why the main function of the enterprise, except profit making, is a realization of specific social aims such as environment protection or economic growth of given region (BUDZYŃSKI 1997, p. 17).

Following the interpretation of CSR published in European Commission Green Paper (2001) it is important to point out that being socially responsible means not only complying with relevant legislation, but also going beyond compliance and investing more than required into human capital, the environ-

ment ant the relations with stakeholders. CSR means integration of social and environmental concerns within business but it can not be understood as philanthropy. The emphasis is on how enterprises do their daily work in order to make profit. It is relevant to businesses of all shapes and sizes. Because there is a common consensus about the importance of that concept, it is observed that more and more companies are getting aware that they can contribute to sustainable development by managing their operations in such a way as to enhance economic growth and increase competitiveness whilst ensuring environmental protection and promoting social responsibility, including consumer interests (*Corporate Social Responsibility* 2002, p. 5). It confirms that CSR is a very wide-ranging concept which can be divided into four main areas (*European...* 2009, p. 107):

– workplace CSR – refers to how a company treats its employees with relation to such issues as recruitment, pay and working conditions, health and safety, recognition of trade unions;

– market-place CSR – ethical behaviour towards suppliers, customers and competitiors;

– environment related CSR – commitment to minimizing negative impacts on environment thanks to production of goods and services environment-friendly or optimizing resources and energy;

– community CSR – refers to relations between the company and its local community, and can take different forms, for example, human rights protection, dialogue and partnership with potentially affected communities or active contribution to community well-being, for instance through employee voluntary scheme or promotion of entrepreneurial initiatives in the region.

Causes of growing interest in CSR (micro-, and macroeconomics benefits)

A concept of corporate social responsibility has been getting more and more popular. According to European Commission, CSR "can play a key role in contributing to sustainable development while enhancing Europe's innovative potential and competitiveness". The importance of CSR cannot be underestimated in the face of the current financial crisis. It turns out that there is a real need for social responsibility in case of all members of the European Union, including Poland in the context of globalization and increasingly challenging international environment. Although according to FRIEDMAN (1970) "the business of business is business" but it is also stated in a much-quoted article that "there is one and only one social responsibility of business – to use its resources and engage in activities designed to increase its profits so

long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud" (*European...* 2008, p. 107). This statement can suggest that efficiency and ethics must go hand in hand. The assumption that the prime responsibility of an enterprise is to generate profits for its owners and shareholders seems to be oversimplification because a firm can at the same time contribute to social and environmental objectives, through integrating corporate social responsibility into its core business strategy which brings not only economic but also social benefits. It's worth analyzing the causes of a growing interest in enterprises CSR involvement in European society. An increasing environmental and social awareness of importance of that concept in present economy is an effect of the following fundamental changes (*Corporate...* 2002, p. 6):

– globalization has created new opportunities for enterprises, but it also has increased their organizational complexity and has imposed upon the firms the necessity to be responsible on a global scale, particularly in developing countries it appeared as a result of increasing concern about the damage caused by economic activity to the environment;

– changing perceptions of the role of business in society through the media, education, and actions undertaken by stakeholders;

– image and reputation play an increasingly important role in the economy based on intangible capital, which causes that in an increasing number of enterprises and industries, CSR is becoming a competitive necessity, moreover, can be a competitive differentiator;

– the nature of the knowledge economy means that social capital- the quality of and quantity of relations developed by an enterprise- is becoming a decisive factor of its future competitiveness and can bring networking opportunities;

– as knowledge and innovation become increasingly important for competitiveness, enterprises have a higher interest in retaining well-educated and competent personnel; furthermore, there is a necessity to attract and maintain well- motivated and committed employees because the speed of market and technology change requires flexible and engaged staff;

– social criteria are increasingly influencing the investments decisions of individuals and institutions both as consumers and as investors, partly as a consequence of this, financial stakeholders ask for the disclosure of information going beyond traditional financial reports so as to allow them to better identify the success and risk factors inherent in a company and its responsiveness to public opinion.

It is worth underlying that CSR brings economic benefits not only at microeconomic but also at macroeconomic level. First of all, the strongest evidence of a positive impact of CSR on competitiveness can be observed at

a firm level. A number of companies with good social and environmental records indicate that these activities are decisive for better financial performance and their growth in the long term. This economic impact of corporate social responsibility can be broken down into direct and indirect effects. Positive direct results may be, for example, derived from a better working environment, which leads to a more committed and productive workforce or from efficient use of natural resources which equals reduction of costs. The strongest evidence of a positive impact of CSR on competitiveness is observed in case of human resources, risk and reputation management. Actions undertaken by companies to enhance their supplier networks or to improve employee morale often lead to increased productivity and quality along with reduced complexity and costs. The ability to attract and retain employees is responsible for a growth in turnover and reduction of costs associated with recruitment and training. The additional benefit seems to be also a higher motivation amongst employees (*European SMEs*... 2002, p. 12). It is worth underlying that certain aspects of CSR, such as the creation of employee-friendly work places thanks to investment in the social area, like training, management-employee relations, can have an impact on productivity and enhance firm capacity for innovation, which seems to be especially desired in the face of a growing competitive pressure. Greater attention to social and environmental issues, and closer cooperation with other stakeholders are catalysts for companies to develop new products and new business models. Even though, the realization of the concept of CSR can also bring indirect effects resulting from the growing attention of consumers and investors, which will increase their opportunities on the markets (*Green Paper*... 2001, p. 7). Opinion of investors and consumers should also be taken into account. A realization of the concept of CSR can increase sales and customer loyalty for the products and services of companies perceived to be responsible for their community and the environment. As it was emphasized before it improves enterprise image and reputation at the same time. Due to improvement of enterprise image and reputation, the firm;s ability to attract capital, trading partners and potential investors is getting better. It is commonly known that financial institutions make increasing use of social and environmental checklists to evaluate the risks of loans, and investments in companies which can not be underestimated by firms wanting to develop in the long term. In recent years, socially responsible investing (SRI) has undoubtedly experienced a strong surge in popularity among investors. Finally, it should be noticed that CSR policies can strengthen the symbiotic relationship between enterprise and society through creating the atmosphere of trust in cooperation with other stakeholders (business partners, suppliers and consumers). It is worth mentioning that undertaken activities in the area of CSR positively influence also

the innovation performance, perceived as a major contributor to economic growth, and can help manage firm's risk, its intangible assets, internal processes, and relations with internal and external stakeholders (*Corporate Social responsibility*... 2002, p. 9). That is why, an increasing number of firms, no matter the size or shape, is trying to embrace a culture of CSR. It obviously requires greater flexibility and means higher spending but can not be treated just as a category of financial costs because, as it was proved above, such kind of activities bring many economic profits, especially in the long run.

From a macroeconomic perspective corporate social responsibility seems also to be very important. This kind of practices contribute to (*European*... 2008, p. 116–117):

– greater attention to social and environmental issues which allows to increase the trust of citizens and to promote entrepreneurial culture within members of given society.

– more integrated labour market and promotion of respect for core labour standards;

– ąsocial cohesion thanks to companies engagement in activities aimed at counteracting poverty and social exclusion;

– investment in education and lifelong learning which seem to be necessary in knowledge-based economy;

– public health improvement, as a result of voluntary initiatives undertaken by companies which use environment-friendly technology or provide environment-friendly goods and services;

– protection of environment through reduction of energy and natural resource consumption obtained thanks to investments in eco-innovation and environmental management systems; evidence shows that increased market penetration of energy and resource efficient products and technologies entails very significant potential benefits for both the economy and the environment;

– better innovation performances, especially these related to innovations helping to resolve social problems, which can be a consequence of intensive cooperation not only with the external stakeholders but also thanks to the creation of innovation-friendly environment inside the companies;

The European Commission sees CSR as an important part of the European Strategy for Growth and Jobs. It is getting obvious that corporate social responsibility can contribute to the Lisbon goal of building a dynamic, competitive and cohesive knowledge-based economy. The efficient implementation of the concept of CSR both from the micro-, and macroeconomics perspective gives a real chance to obtain all of the goals mentioned above. There are strong reasons for believing that CSR can have a positive impact on competitiveness at European, national, regional and sector level. As a competitive necessity, CSR is something that business and public authorities cannot disregard.

Demand for CSR in Poland – perspectives on the future

Corporate social responsibility is a relatively new idea in Poland which appeared at the end of the 90s. Looking at the knowledge development related to CSR from the perspective at least the last 10 years, it should be clearly emphasized that the level of knowledge of social and environmental issues in Polish economy has increased so far. In spite of the lack of complete knowledge of potential benefits which CSR can bring, especially related to SMEs, the positive tendencies have also been observed recently. It is worth underlying that more and more enterprises have significantly increased the scale of their involvement in social and environmental issues. This tendency is commonly observed in case of both large and small-sized enterprises which more often implement projects of providing clear and transparent rules, reliable communication and establishing better relations with their stakeholders. Now business leaders understand now that they cannot effectively run their companies without their clients and partners' trust or without their employees understanding what is expected from them (*Corporate...* 2007, p. 29–30). It is getting obvious that business must go hand in hand with ethics. Without any doubts, the majority of Polish society recognizes responsible business as business related ethical activities, meaning honest behaviour towards all kinds of stakeholders, such as: employees, customers, investors, local community etc. On the basis of many researches conducted in the field of CSR in Poland, it can be noticed that awareness of business social responsibility is getting more and more important not only in case of enterprises but also consumers. About 60% of large companies, over half of medium-sized enterprises and about 40% of small companies declare that running a business should comply with the needs of local societies and environmental issues (CSR and Competitiveness, 2007, p. 2). Unfortunately, these declarations concerning CSR are not always realized in practical actions.

Figure 1 presents at least three levels of CSR maturity in Polish enterprises such as: advanced, intermediate and introductory. The Pioneers (15%), the most often international corporations, which implement CSR into their strategy, belong to an advanced level. Enterprises being the pioneers are aware of the potential carried by CSR. Every stage of social responsibility development is an opportunity to improve their business operations and build lasting public trust. They are conscious of the role of business in the contemporary society concentrating their CSR strategy on the needs and specificity of the local market and the main problems of the most stakeholders. The second level, called intermediate, is represented by companies which focus on social activities programs, very often targeted at employees as the most essential stakeholders, to improve their image and encouraged them to pro-social activities.

Unfortunately, hesitating companies (45%) use neither CSR management tools nor independent audits. Finally, there is an introductory level where beginners in the field of CSR have no strategy and they are usually represented by Polish SMEs as well as some large companies. However, beginners as members of the local communities also focus on good relations with their stakeholders through involvement in a number of sponsorship activities which are uncoordinated but very important from the point of view of the local community, in which they function (*Corporate...* 2007, p. 57–59). It is worth noticing that beginners hold a limited dialogue with their stakeholders, defined as business partners and clients. As a rule, they reduce their communication only to assure public discourse required by law. These companies have tools of improving management, e.g. ISO 9001:2001, but they apply them only to ensure the transparency of the company's management processes.

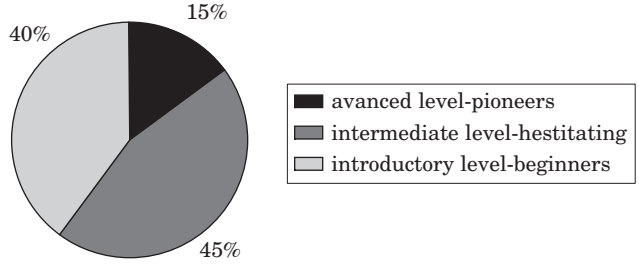

Fig. 1. Polish companies and CSR
Source: Corporate Social Responsibility in Poland- Baseline Study, UNDP, Warsaw 2007.

The strategy of social responsibility itself is the best-developed issue exclusively in large companies, especially in case of multinationals where is treated as a part of their overall global strategy. On the other hand, all small Polish businesses have no CSR strategy. In spite of that, they are usually good members of their local communities, and fulfill basic obligations. Although various companies, in particular multinational corporations, voluntarily undertake different activities for the sake of different stakeholders, the social and political climate do not facilitate the promotion and application of corporate social responsibility in Poland. Realization of the idea of CSR required long term thinking and still seems to be a matter of future, especially in the face of the major problems of many businesses and management staff, such as paying salary, getting funds for development or exacting debts from creditors (*Corporate...* 2007, p. 9). One of the serious hindrances to development of CSR practices among Polish SMEs seems to be not only their difficult economic situation but also the level of trust towards business which, in case of Poland,

is undermined by financial frauds, corruption and other irresponsible practices. Many researches proved that the quality and the amount of social capital often identified with trust, leaves a lot to be desired. Polish society believes that private business brings no benefits to members of its community, and their attitude towards the business generally remains ambivalent. It causes that Polish businesses, large and small, have to operate in a society where 60% believe that private businesspeople do not normally obey the law, and nearly 50% claim that they are dishonest. What especially worries, over 60% Poles are dissatisfied with the fact that Poland has chosen the free market economy and term such as capitalism, private property and wealth usually evoke negative connotations (*Corporate...* 2007, p. 30).

A great majority of CSR campaigns in Poland is undertaken by large companies, often widely recognized, and with foreign origins. They simply can afford such kind of initiatives. However, it is worth noticing that at the same time many Polish SMEs are also trying to implement the concept of CSR successfully and they manage to do that. Large enterprises realize it on a bigger scale and are much more effective in communicating this information outside the company, whereas many interesting CSR practices of SMEs are not so visible and therefore much more difficult to identify. Polish SMEs very often support such kind of social activities as sport, health and culture for the sake of community in which they exist. The research made in year 2005 revealed that customers and employees are the most important areas of CSR in case of small firms in Poland, whereas involvement aiming at the local community were often spontaneous and undertaken because of altruistic motives (CIEPIELA, ORŁOWSKI 2008, p. 66–67). In global corporations CSR is usually perceived as a part of global strategy and Polish branch of TESCO or British American Tobacco can be an example of that. However, it looks completely different in case of a firm like Danone, where each local branch has got freedom of action related to CSR. That is why a popular campaign "Share a meal" brought into life by Danone is exclusively a Polish idea, which found wide acceptance in many other countries.

The examples shown above prove that CSR in Poland is getting more and more popular. The report on "Perception of responsible business and social involvement among Polish enterprises" shows that the majority of CSR actions are motivated by emotional aspects of personal features (morality, ethics) of companies; management. Another motivation refers to using responsible business as a marketing tool which can improve company's image, its market position, and as a result, bring more profit (*CSR and...* 2007, p. 10). More and more entrepreneurs assert that CSR should undoubtedly help to build positive image of their companies, but this kind of initiatives cannot be perceived only one-dimensionally, as "a package for PR". Regardless of their true motives, an

increasing number of SMEs in Poland simply decide to apply the concept of CSR as a result of market requirements. Because of the fact that their social activities are mainly addressed to customers and employees, the potential stakeholders must give credit to the undertaken initiatives. As a consequence of that, they are trying to pay greater attention to the quality of products and services and treat their employees more responsibly offering trainings, co-financing sport or cultural activities, introducing motivation programmes, timely payment of salaries, etc. It confirms that CSR is more often perceived by Polish enterprises as a way to "distinguish from a crowd of competitors".

According to the report "Responsible business in Poland in 2008" companies such as: Kompania Piwowarska SA, Danone or Toyota Motor Poland Company Limited are considered the most responsible. In the context of discussion on CSR in Poland, it is worth presenting some examples of activities which were implemented by the honored companies last year. Taking into account activities in the field of CSR, it turns out that Kompania Piwowarska SA was an absolute leader in the year 2008. The company, together with other breweries belonging to SABMiller international group, defined 10 priorities of sustainable development. A great importance in the advertising campaigne called "Check percentages" was especially attached to such issues as responsible sale and alcohol consumption. Moreover, during the analyzed period, the company also undertook pro-ecological actions like "In Harmony with Nature". It is an educational and ecological program for employees, concerning the rules and environmental policy of the company which should be put into practice in their private lives. It is worth underlying that the effects of ecological investment undertaken during the last three years by Kompania Piwowarska SA are clearly observed also in the form of cost reduction (*Report...* 2009, p. 29 and p. 59). That is why, there are many companies which participate in social and pro-ecological actions more and more willingly. The Danone firm, for example, well known for its social actions, concentrated itself on interpersonal communication in the year 2008. Its program "Bumerang" was aimed at building organizational culture based on reciprocal respect and employees participation in meetings in the form of a dialogue, where the standards of cooperation are collectively worked out, or desirable and undesirable ways of behaviour are commonly discussed. The next initiative for sustainable development introduced by Danone is titled "Yoghurts for the environment". Within the framework of this project the company is mainly focusing on reduction of energy, water and carbon dioxide emission. Toyota Motor Manufacturing Poland can be an example of good practice in 2008. Since 2006 the firm has been participating in the campaigne "Safe driver" together with The Wałbrzych Academy of Save Driving, giving both financial and professional support (*Report...* 2009, p. 49).

Table 1

Ranking social responsible firms in 2008

Company	The basis of CSR	Customer relations	Business partners relations	Employees relations	Ecological responsibility	Social engagement	Sum
Kompania Piwowarska SA	96	100	91	92	84	100	563
Danone	100	100	76	100	92	92	560
Toyota Motor Poland Company Limited	95	92	80	95	100	90	552
British American Tobacco Polska	100	97	76	95	92	75	535
Tesco Polska	100	85	76	95	88	70	504
Telekomunikacja Polska	79	92	63	95	80	95	504
Henkel Polska	56	100	75	95	92	82	500
Microsoft	85	79	81	85	80	87	497
Coca-Cola HBC Polska	88	92	61	92	100	63	496
GlaxSmithKline Pharmaceuticals	63	94	61	95	92	87	492

Source: *Raport Odpowiedzialny Biznes w Polsce 2008*. 2009.

Generally speaking, in spite of many obstacles such as: perceived and/or actual costs, lack of awareness of business benefits, conflicting time and other resource pressures or simply immediate pressures from the daily struggle to survive commercially, there is a real need for CSR practices in Polish enterprises in the future. It is getting simultaneously obvious that CSR activities should support strategic goals of the company and show all of the stakeholders that it is considered to be a long-term value, decisive for its future development.

Conclusions

Corporate social responsibility is a relatively new idea that came to Poland from western developed countries at the beginning of 90s. It throws a new light on the role of the business sector in contemporary society. In accordance with CSR concept, each enterprise performing its traditional economic functions of making profits, creating new workplaces, and reinvesting for future growth, should broaden its economic and legal responsibility for the sake of society and

environment. In practice, an application of CSR brings many potential benefits not only to the enterprises but finally to the whole community in which they exist. First of all, it helps to increase the competitiveness at firm level, influencing organizational culture, the quality of human resources, cost structure, innovation processes, risk and reputation management. However, the importance of the concept of CSR cannot be underestimated also from the point of view of the global economy competitiveness. It is said that CSR can play a key role in contributing to sustainable development while enhancing Europe's innovation potential and competitiveness.

That is why, many Polish enterprises, both large and small-sized, are getting much more conscious of potential benefits relating to the realization of the concept of CSR. It seems to be a good tendency that about 60% of large companies, over half of medium-sized enterprises and about 40% of small companies, declare that running a business should comply with the needs of local societies and environmental issues. In spite of many examples of responsible business initiatives implemented in Poland by such firms as Kompania Piwowarska SA, Danone or Toyota Motor Poland Company Limited, there is still a real need for further promotion and support of activities undertaken in this area. The researches revealed that 50% of interviewed companies have more or less advanced CSR strategy. Moreover, the application of tools and systems of social responsibility management is popular just in case of 15% of companies (called pioneers), where large, multinational corporations dominate. Unfortunately, SMEs which often strive for survival on the market, are still not interested in investments which do not bring immediate effects. One of the reasons for such an attitude is still insignificant knowledge of the idea of CSR, which is often associated with charity, sponsoring outside the company rather than investment into it.

Taking everything into account, the social and political conditions have not facilitated the promotion and application of CSR in Poland so far. In order to popularize the concept of CSR in the future it is worth promoting the implementation of best practice among Polish enterprises, especially in case of SME's, in cooperation with nongovernmental organizations, trade unions, academic institutions and media. In the long run, this strategy will undoubtedly lead to the growth of companies' value and their competitiveness. Finally, this contribute not only to increasing the competitiveness of Polish economy but, first of all, improving the quality of the life of Polish society.

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FINANCIAL MODELING OF BORROWERS' CREDITWORTHINESS

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K e y w o r d s: financial models, financial and economic activity, agricultural organization, estimate the borrowers' creditworthiness, Omsk region.

A b s t r a c t

The complex of financial models for agricultural organization of Omsk region is made on the basis of the method of Rosselkhozbank and of the method of Savings Bank technique to estimate the borrowers' creditworthiness.

MODELOWANIE FINANSOWEJ ZDOLNOŚCI KREDYTOWEJ KREDYTOBIORCY

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S ł o w a k l u c z o w e: modele finansowe, działalność gospodarcza i finansowa, zdolność kredytowa.

A b s t r a k t

Zespół modeli finansowych dla przedsiębiorstw rolnych z regionu Omska opracowano w ramach metodologii banków Rosselkhozbank oraz Saving Bank.

Introduction

Crisis in the financial markets of the USA and Europe has led the growth of rates of attraction of foreign means for banks in our country. It causes toughening of conditions at delivery of loans and requirements at an estimation of credit status of potential borrowers of bank. In connection with growth of the general instability of the markets and deepening of processes of globalization risks' level of bank activity as a whole increases.

The beginning of bank crisis: in February, 2008 the liquidity crisis was declared by the fifth savings and loan association in the Great Britain – Northern Rock. The bank management ascertained, that it could not solve the situation with its own forces and it requested help from the Central bank of the country. The Bank of England has taken an unprecedented step – it has given the state guarantees to all investors of the bank. The total sum of state guarantees exceeded USD 55 billion – about three quarters of the defensive budget of the country.

Then, in March 2008, the Government of the United Kingdom confirmed nationalization of the hypothecary business of a large British bank, Bradford & Bingley, while the retail business of the bank was sold to the Spanish bank group Santander. Bradford & Bingley became the second bank, which the state has been compelled to take under its wings under the conditions of the global financial crisis.

From March till September 2008 there was a radical change of the "financial landscape» in the USA. Investment giants – Bear Sterns & Meryll Lynch ceased their existence through absorption; Lehman Brothers went bankrupt; Indy Mac passed under the federal control with assets of USD 32 billion and deposits of USD 19 billion; at the beginning of September the White House took over the management of hypothecary companies Fannie Mae and Freddie Mac; on the verge of the crash also the insurance company AIG received the emergency credit from the State. The crash of Wa Mu, which had the assets of USD 307 billion, became as for today the last case in the unique series of absorptions and bankruptcies that have transformed the American financial landscape and caused the collapses in the global stock markets. Out of 8500 banks functioning in the USA, 117 are mentioned as possible bankrupts following the results of the first half of the year.

Hypothecary crisis in the USA began in 2006. Growth in non-performing housing loans to unreliable borrowers became its main cause. The crisis built up and started gaining international scales in the spring of 2007 when New Century Financial Corporation, the largest hypothecary company of the USA engaged in crediting unreliable borrowers, was removed from the New York stock exchange. Within next several months, ten similar companies suffered

losses or went bankrupt. In the summer, the crisis reached the investment funds of the largest financial companies, which engaged their means in hypothecary bonds: Bear Stearns, Goldman Sachs, BNP Paribas. In the international markets the liquidity crisis started developing. The Central Banks all over the world started pumping tens and hundreds billions dollars into the financial systems.

The primary goal of our research was to evaluate the available foreign and domestic techniques of financial standing analysis of organizations and to offer one on the basis of regulations of commercial banks. For construction of models the techniques of borrower credit status assessment applied by the Russian Agricultural Bank and the Savings Bank of the Russian Federation were used. The object of the study was 369 (350 – in 2007) agricultural organizations from Omsk area that according to the administrative-territorial division consists of 32 areas, which are broken into 4 zones. During the research regression and discriminant models for estimation of the financial condition have been constructed, which allow defining the level of credit status in case of agricultural commodity producers. Considering various natural-economic conditions of Omsk area, the model also considered the division into four zones: steppe, southern forest-steppe, northern forest-steppe and northern.

Methodology

Among all kinds of risk credit risk is the most essential for the Russian banking sector now. Credit risk, i.e. the danger that the debtor cannot carry out interest payments or pay the credit principal according to the conditions specified in the credit agreement is an integral part of bank activity. The credit risk means, that payments can be delayed or are not paid at all, which in turn can lead to problems in financial flows and can have adverse influence on the liquidity of the bank. Despite innovations in the financial services sector, credit risk remains the principal cause of bank problems. More than 80% of the maintenance of balance reports of banks is devoted usually to this aspect of risk management. There are three principal types of credit risk:

– Personal or consumer risk;
– Corporate risk or risk of the company;
– Sovereign or country risk.

Because of the potentially dangerous consequences of credit risk it is important to carry out the comprehensive analysis of bank possibilities by estimation, administration, supervision, control, realization and return of credits, advance payments, guarantees and other credit tools. The general

review of credit risks management includes the analysis of the policy and bank practice. Such an analysis should also determine the adequacy of the financial information received from the borrower used by the bank during taking the decision on award of credit.

The estimation of credit status of the borrower is most often done by applying the techniques based on the requirements specified in the positions of the Bank of Russia No 254-P «On establishment of provisions for possible loan losses, bad loans and equivalent by the credit organizations» of the 26th of March 2004 and No 28-P «On establishment of provisions for possible losses by credit organizations» of the 20th of March 2006. The main objective of the techniques given is minimization of the reserves established taking into account the statutory requirements.

The bank is given the independent right to make its choice of the techniques to apply. The structure of specific indicators and their criteria are set by the internal documents. Signs of deterioration of financial position (occurrence of a card file of not paid documents to accounts of the borrower, sharp reduction of size of pure actives, absence of the information on the borrower) or signs of deterioration of service of a debt – presence of back payments on percent or the sum of the basic debt, or loan re-structuring are legislatively defined only-.

The credit analysis or the analysis of credit status of the borrower is characterized by a number of features. First, there is a time distinction between credit status and solvency (credit status is the perspective solvency of the borrower, which estimation should cover the prospective period of using the credit. Second, concepts differ also in the "spatial" relation (solvency is possibility and ability in due time to extinguish all kinds of obligations and debts, and credit status is characterized only by firm possibility to extinguish credit debts). Third, during credit status estimation it is necessary to consider not only the ability of the client, but also decency, desire in due time to repay a debt.

According to the Technique of the analysis and estimation of the financial condition of borrowers of Open Society "Russian Agricultural Bank" taking into account their branch features and features of the organizational-legal form confirmed by the Decision of Board of Open Society "Russian Agricultural Bank" (the report No 65 from 25.11.2004), as criteria of an estimation of a financial condition of the borrower the following indicators are used:

– financial stability;
– liquidity (solvency);
– financial results (profit, loss);
– cash flow for the term of crediting.

The following three groups of indicators are used as estimated indicators of the current financial condition:

Indicators *of financial stability (independence):* factor of financial independence; security factor of own means;

Liquidity indicators*:* factor of current liquidity; factor of absolute liquidity; factor of urgent liquidity (or the critical estimation);

Indicators *of business activity*: indicators of turnover; indicators of profitability.

According to the present Technique factors share on:

– *obligatory* – factor of financial independence (K_1), security factor of own means (K_2), factor of current liquidity (K_3), factor of urgent liquidity (the critical estimation) (KK_4), factors of profitability (K_5), turnover of assets (K6);

– *recommended* (which are used for the estimation if necessary) – factor of absolute liquidity, factors, short-term liabilities and debts; sufficiency of turns in bank.

The financial condition of the borrower is estimated taking into account the points calculated using the obligatory factors. According to the given technique the allocated scores are:

Good financial condition – points scored equal to or more than 53 points.

The average financial condition – points scored from 25 to 52 inclusive.

The bad financial condition – quantity of the typed points makes less than 25 points.

The technique of the borrowers (legal entities) credit status estimation applied by the Savings Bank of Russia: Regulations on granting credits to legal entities and individual businessmen of the Savings Bank of the Russian Federation and its branches (confirmed by Committee for granting of credits and investments of the Savings Bank of Russia 30.06.2006, the report No 322).

For the estimation of credit status of the borrower the Savings Bank uses three groups of estimated indicators:

– Liquidity factors – factor of absolute liquidity (K_1), factor of fast liquidity (K_2^1), factor of current liquidity (K_3);

– Factor of presence of own means (K_4);

– Indicators of turnover profitability – turnover of assets, turnover of debts, turnover of stocks, profitability of production (profitability of sales) K_5, profitability of enterprise activity (K_6), profitability of investments in the enterprise.

The basic estimated indicators are factors K_1, K_2, K_3, K_4, K_5 and K_6. The estimated results of calculations for the six factors result in category assignment for each of these indicators on the basis of the comparison of the values received with the values considered sufficient.

Table 1

Division of indicators into categories depending on their actual values

Factors	Category 1	Category 2	Category 3
K_1	0.1 and above	0.05–0.1	Lower than 0.05
K_1	0.8 and above	0.5–0.8	Lower than 0.5
K_1	1.5 and above	1.0–1.5	Lower than 1.0
K_1			
Except trade and leasing companies	0.4 and above	0.25–0.4	Lower than 0.25
For trade and leasing companies	0.25 and above	0.15–0.25	Lower than 0.15
K_5	0.1 and above	Lower than 0.10	Not applicable
K_1	0.06 and above	Lower than 0.06	Not applicable

$$S = 0.05 \times \text{Category } K_1 + 0.10 \times \text{Category } K_2 + 0.40 \times \text{Category } K_3 + 0.20 \times \\ \times \text{Category } K_4 + 0.15 \times \text{Category } K_5 + 0.10 \times \text{Category } K_6$$

In conformity with the given technique 3 classes of credit status of the organizations are established:

class 1: crediting raises no doubts, $S = 1.25$ and less;

class 2: crediting demands a weighed approach, S from 1.25 (not inclusive-) to 2.35 (inclusive);

3 class: crediting is connected with the raised risk, S is more than 2.35.

Results

Author's models for estimation of credit status of the borrowers (agricultural organizations)

The research covered 369 agricultural organizations (in 2007 – 350 agricultural organizations) from Omsk area, according to the administrative-territorial division into 32 areas which are divided into 4 natural-economic zones: steppe (9 areas; 86 organizations); southern forest-steppe (8 areas, 80 organizations); northern forest-steppe (9 areas, 121 organizations); northern (6 areas, 82 organizations).

By the Savings Bank technique: The annual financial reports of all the agricultural organizations from Omsk area for 2005–2007 were used for modeling the indicators. All of the 6 basic factors provided by a technique of the Savings Bank were calculated.

Applying the data substitution method, the limits of experimental classes within 100 points scoring system were defined taking the Design procedure of indicators for agricultural commodity producer's financial condition of (the Governmental order of the Russian Federation from January 30, 2003 No 52) as the baseline. The research results allowed formulating the following bands of credit status: class 1 – from 100 to 69 points; class 2 – from 69 to 42 points; class 3 – below 42 points.

Analysis of the financial condition of the organization and definition of the significant factors influencing the level of credit status allows the credit organizations defining the possibility of crediting the specific organization correctly, and the organization is given a chance to manage those factors to increase its potential for obtaining credit from the bank. It confirms the practical importance of econometrics based on multidimensional statistical analyses.

To design the regression equation it is necessary to generate the initial matrix. Data in the matrices are grouped according to the years, natural-economic zones and as a whole Omsk area. The data from the annual financial statements of the agricultural organizations from Omsk area for 2005–2007 was used. After the data input as presented in a matrix the following information is received. In Table 2, the general results of estimation of the six-factorial of regression are presented according to the model designed on the basis of data on Omsk area as a whole for 2007.

The following characteristics of the constructed regression equation resulted-: R – value of selective correlation factor; R_2 – value of determination factor; adjusted R_2 – value adjusted by the number of the determination factor freedom degrees; F – obtained value of Fisher's test, used for check of the hypothesis concerning the significance of the regression equation, r – significance level; Std. error of estimation – the standard error of estimation of the regression equation.

Table 2

The general results of the estimation regression models for Omsk area for 2007

Intercept	Beta	Std. Err.	B	Std. Err.	$t(343)$	p-level
			28.88420	1.365349	21.15518	0.000000
K_1	0.027762	0.052598	0.27591	0.522750	0.52781	0.597975
K_2	-0.014748	0.049176	-0.05948	0.198316	-0.29991	0.764427
K_3	0.225652	0.053319	0.22629	0.053469	4.23212	0.000030
K_4	0.694109	0.03464	-38.21893	1.907740	20.03361	0.000000
K_5	-0.044456	0.033853	-2.39926	1.82698	-1.31323	0.189982
K_6	0.046040	0.033586	0.35563	0.259432	1.37081	0.171331

Where K_1 – factor of absolute liquidity; K_2 – intermediate factor of coverage; K_3 – factor of current liquidity; K_4 – factor of presence of own means; K_5 – profitability of sales; K_6 – profitability of activity of the organization.

Regression Summary for Dependent Variable: B
R = , 92730491, R_2 = , 81984902, Adjusted R_2 = , 81319915
F (6.343 = 93.212, p < 0.0000 Std. Error of estimate: 5.854

Thus, the correlation factor in 2007 is equal to 0.9273, which indicates a rather high correlation between degree of credit status and the factors included in model.

In 2007 the determination factor is equal to 0.8132. It means, that the constructed regression equation in approximately 81% of cases reproduces the dependence on factors ($K_1 – K_6$), i.e. the productive indicator -depends 81% on these factors. The other 19% represent the share of casual and not considered factors. The value of the Fisher's test for the degrees of freedom (6.343) is equal to 93.212, which is above its tabular (theoretical) value for confidentiality level $R = (1 – 0.05) = 0.95$, and this in turn corresponds to the significance value of less than 0.0000. Hence, the received regression equation is significant, instead of the results of casual selection by the supervision.

The results of the analysis provided by the results of the regression equation present the economic situation of the entire Omsk area divided according to the natural-economic zones in 2007:

Regional area:

$$B = 28.88 + 0.27K_1 – 0.05K_2 + 0.22K_3 + 38.21K_4 – 2.39K_5 + 0.35K_6$$

Steppe zone:

$$B = 7.30 – 2.96K_1 + 0.22K_2^1 + 0.55K_3 + 70.84K_4 – 6.82K_5^1 + 10.64K_6$$

Southern forest-steppe:

$$B = 22.70 + 1.61K_1 + 0.34K_2^1 + 0.02K_3 + 48.96K_4 – 4.61K_5 – 0.78K_6$$

Northern forest-steppe:

$$B = 33.62 + 3.36K_1 – 0.13K_2 + 0.33K_3 + 26.23K_4 + 3.83K_5 – 0.25K_6$$

Northern zone:

$$B = 14.52 + 6.93K_1 – 2.54K_2 + 0.33K_3 + 57.50K_4 + 3.85K_5 + 0.21K_6$$

The results of the analyses indicated that despite the importance of each equation as a whole, not all the factors are significant. So, if p-level exceeds the set significance value (α) of 0.05 the named factors are -insignificant in the regress equation. The significant factors, with the greatest impact on credit status level, were those with the greatest significance value (p-level < 0.05).

Conducting the step-by-step correlation, i.e. consistently excluding from the models the factors of the least importance, the following results were obtained (Tab. 3).

Table 3

The general results of an estimation of four-factor model for Omsk area for 2007

Intercept	Beta	Std. Err.	B	Std. Err.	$t(345)$	p-level
			28.82849	1.356994	21.2443	0.000000
K_4	0.693766	0.034468	38.20003	1.897875	20.12778	0.000000
K_3	0.235861	0.034310	0.23653	0.034406	6.87448	0.000000
K_6	0.045907	0.033502	0.35460	0.258781	1.37027	0.171493
K_5	-0.042866	0.033621	-2.31344	1.814517	-1.27496	0.203180

Regression Summary for Dependent Variable: B
R =, 92710060, R_2 =, 81952735, Adjusted R_2 =, 81511608,
F (4.345 = 140.44, p < 0,0000 Std. Error of estimate: 5.815

Thus, we have received the complex of the equations containing the most significant factors, influencing the credit status:
In 2007 area: $B = 28.82 + 0.23K_3 + 38.20K_4 - 2.31K_5 + 0.35K_6$
Steppe zone: $B = 6.69 - 2.61K_1 + 0.56K_3 + 70.98K_4 + 6.70K_6$
Southern forest-steppe: $B = 22.80 + 2.35K_3 + 49.71K_4 - 5.44K_5$
Northern forest-steppe: $B = 33.49 + 4.75K_1 + 0.24K_3 + 26.64K_4$
Northern zone: $B = 13.78 + 6.99K_1 - 2.52K_2 + 0.35K_3 + 57.09K_4 + 0.20K_6$

By the Russian Agricultural Bank technique: The 6 basic factors provided by technique of the Russian Agricultural Bank were used for modeling indicators of the annual financial statements of all agricultural organizations from Omsk area for 2005–2007. Applying the data substitution method, the limits of experimental classes within 100 points scoring system were defined taking the Design procedure of indicators for agricultural commodity producer's financial condition (the Governmental order of the Russian Federation from January 30, 2003 No 52) as the baseline. The research results allowed formulating the following bands of credit status: class 1 – from 100 to 42 points; class 2 – from 42 to 26 points; class 3 – below 26 points.

Table 4

The general results of the estimation regression models for Omsk area for 2007

Intercept	Beta	Std. Err.	*B*	Std. Err.	*t*(343)	*p*-level
			29.57775	1.384764	21.35942	0.000000
K_1	0.685505	0.034189	37.80690	1.885584	20.05050	0.000000
K_2	0.061420	0.033320	0.17393	0.094354	1.84336	0.066139
K_3	0.233361	0.046195	0.23402	0.046325	5.05165	0.000001
K_4	0.012488	0.045083	0.05036	0.181809	0.27700	0.781946
K_5	-0.048720	0.033090	-0.23071	0.156694	-1.47237	0.141837
K_6	0.036888	0.033157	0.28494	0.256119	1.11251	0.266697

Where: K_1 – factor of financial independence, K_2 – security factor of own means, K_3 – factor of current liquidity, K_4 – factor of urgent liquidity, K_5 – profitability factor, K_6 – factor of turnover on activities.

Regression Summary for Dependent Variable: *B*
R =, 89176679, R_2 =, 82689464, Adjusted R_2 =, 82036802,
F (6.343 = 96.052, $p < 0$, 0000, Std. Error of estimate: 15.706

Estimating the received results, it is possible to draw the conclusion on high narrowness of communication between degree of credit status and the factors included in model (the correlation factor is equal to 0.8917), and also that the received equation of regression is significant, instead of the result of casual selection of supervision (the determination factor is equal 0.82 and settlement size of criterion of Fisher above tabular value).

The analysis results led to obtaining the following regression equations.
In 2007 area:
$B = 29.57 + 37.80K_1 + 0.17K_2 + 0.23K_3 + 0.05K_4 - 0.23K_5 + 0.28K_6$
The steppe:
$B = 8.91 + 70.66K_1 + 1.47K_2 + 0.37K_3 - 0.53K_4 - 0.32K_5^1 + 4.91K_6$
Southern forest-steppe:
$B = 19.63 + 50.11K_1 + 1.17K_2 + 0.08K_3 + 0.61K_4 + 2.07K_5 - 6.21K_6$
Northern forest-steppe:
$B = 33.52 + 26.04K_1 + 0.11K_2 + 0.45K_3 - 0.30K_4 - 0.06K_5 - 1.03K_6$
Northern zone:
$B = 16.71 + 53.77K_1 + 1.83K_2 + 0.28K_3 - 0.36K_4 - 0.02K_5 + 0.19K_6$

The research showed that the estimation could be focused on two indicators making the most essential impact on the financial condition of agricultural commodity producers:

– Factor of presence of own means (K_4) for which the indicator of probability of an error (p-level) is equal to 0.0000,

– Factor of current liquidity (K_3) for which the p-level is also equal to 0.0000.

During research discriminant models for estimation of credit status of borrowers based on the database of agricultural organizations from Omsk area have been constructed. Design procedure of indicators for agricultural commodity producer's financial condition (the Governmental order of the Russian Federation from January 30, 2003 No 52) was also used as the baseline for the design of the discriminant factorial model. Use of scoring estimation allowed classification of the research objects to one of three groups of credit status (representing the financial condition).

According to the Savings Bank technique:

Table 5

Results of the analysis of discriminant functions for the whole Omsk area for 2007

	Wilks' Lambda	Partial Lambda	F-remove	p-level	Toler.	1-Toler. (R-Sqr.)
K_1	0.412334	0.995209	0.8232	0.439884	0.415680	0.584320
K_2	0.415740	0.987054	2.2427	0.107727	0.466326	0.533674
K_3	0.428441	0.957794	7.5352	0.000627	0.420867	0.579133
K_4	0.855155	0.479864	185.3508	0.000000	0.971287	0.028713
K_5	0.418419	0.980736	3.3588	0.035926	0.958499	0.041501
K_6	0.415083	0.988616	1.9691	0.141158	0.982213	0.017788

Discriminant Function Analysis Summary
No. of variables in model: 6; Grouping: Var9 (3 groups)
Wilks' Lambda:, 41036 approx. F (12.684 = 31.980, $p < 0.0000$

Table 6

Initial data for the equations on groups for the whole Omsk area for 2007

	*G*_1:1	*G*_2:2	*G*_3:3
K_1	-0.15632	-0.16826	-0.03101
K_2	0.03173	0.08752	0.01328
K_3	0.03289	-0.00081	0.00095
K_4	8.97384	7.16354	0.91444
K_5	-0.68149	-0.98190	0.01090
K_6	0.05198	0.03599	-0.05807
Constant	-5.04716	-3.89890	-1.20227

Classification Functions; grouping: *G*

Thus, the system of the equations is:

Area:

$G_1 = -5.05 - 0.16K_1 + 0.03K_2 + 0.03K_3 + 8.97K_4 - 0.68K_5 + 0.05K_6$

$G_2 = -3.89 - 0.17K_1 + 0.09K_2 - 0.001K_3 + 7.16K_4 - 0.04K_5 + 0.04K_6$

$G_3 = -1.20 - 0.03K_1 + 0.01K_2 - 0.001K_3 + 0.91K_4 + 0.01K_5 - 0.06K_6$

Steppe zone:

$G_1 = -15.42 - 0.59K_1 + 0.14K_2 + 0.04K_3 + 34.03K_4 + 6.92K_5 - 2.51K_6$

$G_2 = -11.08 - 0.06K_1 + 0.04K_2 - 0.04K_3 + 28.23K_4 + 8.01K_5 - 2.82K_6$

$G_3 = -3.28 + 0.09K_1 - 0.05K_2 - 0.02K_3 + 12.4K_4 + 7.23K_5 - 3.79K_6$

Southern forest-steppe:

$G_1 = -1.67 + 0.07K_1 - 0.03K_2 - 0.002K_3 + 2.93K_4 - 0.36K_5 + 0.13K_6$

$G_2 = -2.75 - 0.07K_1 - 0.001K_2 - 0.006K_3 + 4.10K_4 + 0.30K_5 - 0.45K_6$

$G_3 = -1.96 - 0.19K_1 + 0.09K_2 + 0.004K_3 + 3.09K_4 - 0.03K_5 - 0.57K_6$

Northern forest-steppe:

$G_1 = -3.29 - 0.92K_1 - 0.10K_2 + 0.11K_3 + 3.88K_4 - 0.51K_5 - 0.10K_6$

$G_2 = -2.68 - 0.51K_1 + 0.04K_2 + 0.03K_3 + 3.15K_4 - 0.57K_5 - 0.32K_6$

$G_3 = -0.97 - 0.05K_1 - 0.01K_2 + 0.008K_3 - 0.45K_4 - 0.61K_5 - 0.31K_6$

The northern:

$G_1 = -32.93 - 0.16K_1 + 0.08K_2 - 0.03K_3 + 71.09K_4 + 1.17K_5 + 0.23K_6$

$G_2 = -24.05 - 0.24K_1 + 0.15K_2 - 0.06K_3 + 58.26K_4 - 2.22K_5 + 0.18K_6$

$G_3 = -5.05 - 0.13K_1 + 0.13K_2 - 0.02K_3 + 18.62K_4 - 1.05K_5 - 0.09K_6$

Table 7

Statistics of errors for the whole Omsk area for 2007

	Observed	1	2	3	Highest	Second	Third
1	1	0.593849	0.368347	0.037803	1	2	3
2	1	0.745449	0.241932	0.012620	1	2	3
3	1	0.629958	0.346817	0.023225	1	2	3
4	1	0.897464	0.094120	0.008416	1	2	3
5	3	0.154512	0.262337	0.583152	3	2	1
6	3	0.142467	0.244370	0.613163	3	2	1
7	1	0.591174	0.375289	0.033536	1	2	3
8	3	0.110079	0.206023	0.683898	3	2	1
*9	3	0.394454	0.404863	0.200684	2	1	3
*10	2	0.548031	0.390896	0.061073	1	2	3
	etc.						
348	2	0.291505	0.383828	0.324667	2	3	1
349	3	0.018692	0.062457	0.918851	3	2	1
350	1	0.730353	0.261720	0.007927	1	2	3

Statistics for Each Case
Incorrect classifications are marked with *
Analysis sample $N = 350$

Table 8

Results of the analysis of discriminant functions for the whole Omsk area for 2007

	Wilks' Lambda	Partial Lambda	F-remove	p-level	Toler.	1-Toler. (R-Sqr.)
K_1	0.863778	0.437144	220.1754	0.000000	0.972505	0.027495
K_2	0.392288	0.962546	6.6539	0.001462	0.995686	0.004314
K_3	0.378736	0.996989	0.5163	0.597161	0.538042	0.461958
K_4	0.380443	0.992516	1.2894	0.276761	0.543796	0.456204
K_5	0.385852	0.978601	3.7392	0.024750	0.993623	0.006377
K_6	0.384719	0.981484	3.2260	0.040930	0.994793	0.005207

According to the technique of the Russian Agricultural Bank:
Discriminant Function Analysis Summary
No. of variables in the model: 6; Grouping: G (3 groups)
Wilks' Lambda:, 37760 approx. F (12.684 = 35.760 $p < 0.0000$

Table 9

Initial data for the equations on groups for the whole Omsk area for 2007

	1	2	3
Intercept	-4.04859	-3.50311	-1.69006
K_1	8.90478	4.14748	-0.87928
K_2	0.00755	-0.07138	-0.01675
K_3	0.00007	-0.00812	0.00334
K_4	0.06836	0.03775	-0.00420
K_5	0.02896	0.12736	0.06012
K_6	-0.01276	-0.15009	-0.01466

Classification Functions for G
Sigma-restricted parameterization

Thus, the system of the equations is:
Area:
$G_1 = -4.05 + 8.90K_1 + 0.01K_2 + 0.001K_3 + 0.07K_4 + 0.03K_5 - 0.01K_6$
$G_2 = -3.50 + 4.15K_1 - 0.07K_2 - 0.01K_3 + 0.04K_4 + 0.13K_5 - 0.15K_6$
$G_3 = -1.69 - 0.88K_1 - 0.02K_2 + 0.003K_3 - 0.004K_4 + 0.06K_5 - 0.01K_6$
The steppe:
$G_1 = -15.66 + 40.82K_1 - 0.39K_2 - 0.19K_3 + 0.54K_4 - 0.19K_5 + 4.94K_6$
$G_2 = -7.98 + 24.02K_1 - 0.46K_2 - 0.15K_3 + 0.42K_4 - 0.03K_5 + 4.09K_6$
$G_3 = -3.05 + 9.83K_1 - 0.73K_2 - 0.04K_3 + 0.10K_4 - 0.05K_5 - 0.19K_6$
Southern forest-steppe:
$G_1 = -10.75 + 22.42K_1 + 0.59K_2 + 0.004K_3 - 0.16K_4 + 2.13K_5 - 2.99K_6$
$G_2 = -4.80 + 11.04K_1 + 0.18K_2 + 0.001K_3 - 0.12K_4 + 1.31K_5 - 1.36K_6$
$G_3 = -2.80 - 1.00K_1 + 0.19K_2 + 0.01K_3 - 0.04K_4 + 1.32K_5 - 0.19K_6$
Northern forest-steppe:
$G_1 = -2.84 + 4.26K_1 + 0.03K_2 + 0.05K_3 + 0.01K_4 + 0.54K_5 - 0.64K_6$
$G_2 = -3.36 + 1.56K_1 - 0.05K_2 + 0.005K_3 + 0.01K_4 + 0.49K_5 - 0.33K_6$
$G_3 = -1.72 - 0.81K_1 + 0.01K_2 + 0.01K_3 - 0.02K_4 + 0.46K_5 - 0.25K_6$
The northern:
$G_1 = -29.26 + 62.70K_1 + 1.64K_2 - 0.10K_3 + 0.22K_4 + 1.99K_5 + 0.06K_6$
$G_2 = -11.51 + 21.98K_1 + 0.51K_2 - 0.05K_3 + 0.12K_4 + 0.69K_5 - 0.47K_6$
$G_3 = - 5.17 + 13.12K_1 - 0.66K_2 - 0.02K_3 + 0.07K_4 + 0.26K_5 + 0.02K_6$

Table 10

Statistics of errors for the whole Omsk area for 2007

	Observed	1	2	3	Highest	Second	Third
1	1	0.961004	0.035578	0.003419	1	2	3
2	1	0.981859	0.016702	0.001440	1	2	3
3	1	0.972165	0.025803	0.002032	1	2	3
4	1	0.979272	0.018116	0.002612	1	2	3
*5	2	0.532218	0.216568	0.251214	1	3	2
*6	3	0.479990	0.238672	0.281338	1	3	2
7	1	0.962986	0.033553	0.003462	1	2	3
*8	2	0.397159	0.250741	0.352100	1	3	2
*9	2	0.861896	0.103902	0.034202	1	2	3
10	1	0.939756	0.054205	0.006038	1	2	3
	etc.						
348	1	0.706537	0.165445	0.128018	1	2	3
349	3	0.056942	0.138546	0.804511	3	2	1
350	1	0.985607	0.013601	0.000792	1	2	3

Statistics for Each Case
Incorrect classifications are marked with *
Analysis sample $N = 350$

Conclusions

Thus, the complex of the models is created, allowing analysis of the financial condition of agricultural organization and drawing substantiated conclusion concerning its credit position with the Russian Agricultural Bank.

The offered methods of analysis of the financial condition of the borrower are comprehensible to the Russian conditions, they are adapted for agrarian sector.

Models are created on regional data file and presented in the division according to the natural-economic zones of the area that allows better consideration of their specificity and developing the model allowing more precise estimation of the credit status of agricultural organizations situated in different zones.

The offered models can be applied not only for the estimation of credit status of the borrower, but also for the express analysis of the financial position of agricultural organizations; monitoring of the financial position of the agricultural organizations and the internal audit.

According to the annual financial statements of 350 agricultural organizations registered in the territory of Omsk area in 2007 the following results of the discriminant analysis were received: division into 3 groups of credit status (financial condition), creation of the system of equations for classification of the organization to a certain group of financial stability.

For classification of the organization to a group with a specific financial position the above obtained system of equations helping in defining the greatest G – value is applied, which classifies the organization accessory one of the financial stability groups. In that equation, where the result exceeds the total value means, that the tested organization belongs to that group.

In the tables containing the information on errors (Tabs. 7 and 10) incorrectly classified organizations are marked with an asterisk (*).

The positive aspect of the provided toolkit is that it demonstrates the probability of classification of the organization to a specific financial stability group, although the asterisks in the first row mean errors of the original prospective splitting into groups. If additional data on new organizations is added to the matrix for testing the program will automatically classify them to corresponding financial stability groups.

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ACQUISITION OF AGRICULTURAL LAND IN SELECTED EUROPEAN UNION COUNTRIES

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K e y w o r d s: agricultural land, land sale, usufruct lease of land, land acquisition.

A b s t r a c t

The agricultural land market is being gradually unified in spite of the fact that it still functions in radically different way in two groups of countries. The first one includes 15 old EU member states which acceded to the EU before 2004. The second group comprises the remaining European states which abandoned the system of state and collective management of agricultural land in the 1990s (including 7 new member states which joined the EU after 2004) (*Rynek ziemi rolniczej* 2006, p. 44). This paper is an attempt to analyse the conditions and criteria for agricultural land acquisition by foreigners in selected countries of the European Union. National statistics concerning the prices of land sale and usufruct lease as well as Eurostat data have been used in this study. The trends in the development of agricultural real property markets, particularly in relation to the prices of land sale and usufruct lease, have been analysed.

The agricultural land prices did not undergo significant vaiations in the newly admitted countries before their accession and just after it in 2004. This situation started to change from 2005, when land prices rose significantly in Poland, Latvia, Slovakia and Hungary.

NABYWANIE GRUNTÓW ROLNYCH W WYBRANYCH KRAJACH UNII EUROPEJSKIEJ

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S ł o w a k l u c z o w e: grunty rolne, sprzedaż gruntu, dzierżawa gruntu, nabywanie gruntów.

A b s t r a k t

Rynek ziemi rolniczej w Europie zaczyna ulegać stopniowej unifikacji, mimo że nadal jeszcze funkcjonuje w zasadniczo odmienny sposób w dwóch grupach państw. Do pierwszej należy 15 starych państw członkowskich UE, które przystąpiły do UE przed rokiem 2004. Do drugiej grupy należą

pozostałe państwa europejskie, które w latach dziewięćdziesiątych ubiegłego stulecia porzuciły system państwowej i kolektywnej gospodarki gruntami rolnymi (w tym siedem nowych państw członkowskich, które przystąpiły do UE po roku 2004) (*Rynek ziemi rolniczej* 2006, s. 44). W opracowaniu podjęto próbę zbadania warunków i kryteriów nabywania nieruchomości rolnych w wybranych krajach Unii Europejskiej przez cudzoziemców. Do badań wykorzystano krajowe statystyki cen sprzedaży i dzierżawy gruntów oraz dane z Eurostatu. Przeanalizowano kierunki rozwoju rynków nieruchomości rolnych, zwłaszcza w odniesieniu do cen sprzedaży i dzierżawy gruntów.

Przed akcesją oraz tuż po niej, czyli w 2004 r., w nowo przyjętych państwach UE ceny gruntów rolnych nie zmieniały się w znaczącym stopniu. Sytuacja ta zaczęła się zmieniać od 2005 r., kiedy ceny ziemi znacząco rosły w Polsce, Łotwie, Słowacji i na Węgrzech.

Introduction

The scope of national powers vested in the states belonging to the European Union encompasses regulation of the issues of immovable property acquisition by foreign subjects. The European Union does not exert an impact on the formation of the system of interrelations in a particular country. However, it is inadmissible to create a national pattern of ownership in a totally unrestricted way. It is required that the functioning of a specific ownership system in a given country is not in conflict with the accomplishment of the fundamental European Union goals entered in the Treaty of European Community. They include:

1) freedom of the movement of workers,
2) freedom of the running of business,
3) freedom of rendering services,
4) freedom of capital movement (HARTWICH 2004, p. 27).

A free movement of capital comnstitutes one of fundamental liberties guaranteed by the European Union law. It covers immovable property investments from transition periods established for land purchase (*Sprawozdanie*... 2008). An immovable property (according to its name) is "immovable". It does not change its borders[1]. It is the capital that is contributed to a particular country and invested in an immovable property, although in certain situations the possession of the rights to an immovable property can be a capital.

Aim and methodology

The aim of this study is an attempt to investigate the conditions and criteria for agricultural immovables acquisition by foreigners in selected (seven post-communist and five old fifteen) countries of the European Union.

[1] Cases have been confirmed of a demolition of French monumental castles exported across the Atlantic to the USA and reconstructed.

National statistics of the prices of land sale and usufruct lease as well as Eurostat data have been used in the research. The time scope of the research covers the years 2001–2007. The trends in the development of agricultural real property markets, particularly in relation to the prices of land sale and usufruct lease, have been analysed. Horizontal analysis (the number and burden of restrictions and facilities, and their influence on prices and rent) and vertical analysis (the formation of phenomena over time) have been applied. The findings are presented in tables and graphs.

Results

The 7NMS' legal restrictions in agricultural immovables acquisition by foreigners are presented in Table 1. It results from the table data that Hungary is the only country which does not recognize companies as owners of agricultural land. As far as the conditions of acquiring the right to property are concerned, each of the 7NMS permits agricultural land acquisition by foreigners who have cultivated a given land as residents for at least three previous years. The Czech Republic and Lithuania have even generally allowed such people to acquire agricultural land. On the other hand, Estonia, Lithuania and Slovakia permit acquiring land by companies in which most of the shares are owned by foreigners if they have their registered office in these countries. In the case of Estonia restrictions do not concern plots smaller than 10 ha, while in Poland – below 1 ha (except border regions). In Hungary, acquisition of very small farms (below 0.6 ha) is permitted.

Legal restrictions related to agricultural land acquisition in the selected countries of the "old fifteen" are presented in Table 2. The EU countries enjoying full freedom of immovable property acquisition by foreigners include Portugal, Great Britain and Holland. The EU member states also comprise countries where the principle of the government's minimal interference in the matters of the conveyance of immovable property with a share of foreign subjects is in force. They are: Belgium, Germany and France. On the other hand, the EU states which apply legal regulations in acquiring immovable property by foreign subjects include: Austria, Denmark, Finland, Greece, Spain, Ireland, Luxemburg, Sweden and Italy (SOBOL 2007, pp. 27–33). Restrictions applied in selected European Union Countries ("Old Fifteen") are described below.

It results from Table 3 data that the lowest land sale prices were in Estonia and Lithuania and they did not exceed 500 EUR/ha in 2006 and 2007. Much higher prices were recorded in Latvia, Poland and the Czech Republic, while the highest price level kept up in Latvia (3591 EUR/ha).

Table 1

Legal restriczions related to agricultural land acquisition in the 7 NMS*

Description	Countries						
	The Czech Republic	Estonia	Hungary	Latvia	Lithuania	Poland	Slovakia
Can an EU citizen buy agricultural land?	Yes if the spouse is Czech If he/she lived and ran a farm in the Czech Republic for at least 3 years, they can buy any plot	Yes plots < 10 ha; there are no additional conditions. Plots > 10 ha; Yes if the spouse is from Estonia if he/she lived and ran a farm in Estonia for 3 years, they can buy a leased plot	Yes if the spouse is Hungarian if he/she lived and ran a farm in Hungary for 3 years, they can buy a leased plot	Yes if he/she lived and ran a farm in Latvia for 3 years, they can buy a leased plot if the spouse is Latvian – according to the principle of co-ownership	Yes if the spouse is Lithuanian if he/she lived and ran a farm in Lithuania for 3 years, they can buy any plot there	Yes Plots < 1 ha beyond the border zone: if he/she has lived in Poland for 5 years if the spouse is a Polish citizen Other plots: if the spouse is a Polish citizen and if he/she lived and ran a farm in Poland for 3 years, they can buy a leased plot	Yes if the spouse is Slovak if he/she lived and ran a farm in Slovakia for 3 years, they can buy a leased plot
Can legal persons purchase agricultural land	Yes	Yes	No	Yes	Yes	Yes	Yes
Can legal persons with a registered office in a given country, whose shares belong to EU citizens, buy agricultural land?	Yes, if EU citizens have minority interest	Yes	No	Yes, if EU citizens have minority interest	Yers	Yes, if EU citizens have minority interest	Yes

* 7 NMS – seven new member states

Source: prepared on the basis of *Sprawozdanie*... 2008, p. 8.

Table 2

Legal restrictions related to agricultural land acquisition in selected "old fifteen" countries"

Description	Countries				
	Denmark	Germany	France	Holland	Sweden
Can an EU citizen purchase agricultural land despite restrictions?	Yes after satisfying the following conditions at least 18 years of age, having Danish, EU or EFTA state citizenship, not possessing immovable property abroad, settling in the immovable property withing 6 months, managing an immovable property in person, having proper qualifications recognised by the Ministry of Agriculture	Yes upon receipt of a permission of agricultural administration to purchase an immovable property. Every region has specified regulations concerning the acreage of farms and ways of the usufruct of an immovable property	Yes upon receipt of a permission of a competent public institution SAFER, which safeguards the optimization of the size of farms. A permission in the form of an administrative decision is issued by a department prefect. In the case of a vineyard purchase, a submission of a report at the Ministry of Finance, Economy and Industry is required.	No restrictions	Yes If a buyer does not live in the territory of Sweden, a receipt of the permission of an agency representing the state authority in the region where the acquired immovable property is located is required. An application must be submitted within 3 months from the date of purchase, otherwise the purchase is null and void by operation of law. Relieved from this duty are: foreigners with a domicile in Sweden, having lived in this country for the last 5 years or married to a person who does not have to have a permission.
Can legal persons purchase agricultural land?	Yes, when: shares give the right to majority of vote and at least 10% of the capital, the duty of self-dependent management does not concern an enterprise, an acquisition occurs for specific purposes: social, experimental, educational, research,	As above	As above	No restrictions	Yes, as, above

cont. table 2

Description	Countries				
	Denmark	Germany	France	Holland	Sweden
	the remaining stock/shares are owned by members of the major shareholder's family, a pension fund, or an insurance company, in the case of joint stock companies all shares must be registered.				
Can legal persons with a registered office in a given country, whose shares belong to an EU citizen, purchase agricultural land?	Yes, as above	As above	As above	No restrictions	Relieved are legal persons established on the strength of Swedish law on condition that at least 40% of the capital and 20% of the vote are owned by foreigners

Source: Prepared on the basis of *Nabywanie nieruchomoście*... 2002, p. 51–61.

Table 3

Agricultural land selling prices in 7NMS and in old EU countries in euro per hectare

Description	Years							Average
	2001	2002	2003	2004	2005	2006	2007	
The Czech Republic	1556	1403	1528	1522	1561	1621	1625	1545
Estonia	–	218	–	297	–	464	–	326
Latvia	–	–	546	526	1031	2301	3591	1599
Lithuania	294	321	468	390	406	536	734	450
Hungary	–	–	–	–	676	742	1550	989
Poland	1194	1415	1307	1308	1465	2049	2385	1589
Slovakia	895	878	888	912	946	981	1017	931
Average	985	847	947	826	1014	1242	1817	
Denmark	10330	12211	12920	14669	15995	18787	22791	15386
Germany	9081	9427	9184	9233	8692	8909	8909	9062
France	4913	5384	5778	6079	6567	–	–	5744
Holland	35713	37150	40150	34160	31432	30235	31290	34304
Sweden	1989	1988	2019	2126	2455	3351	3706	2519
Average	12405	13232	14010	13253	13028	15321	16674	

Source: prepared on the basis of data from Eurostat 2001–2008 and *Sprawozdanie*... 2008, p. 9.

Average agricultural land selling prices are presented in Figure 1. It shows that despite the upward tendency in the agricultural land price over the recent period in 7NMS there is still a considerable difference between the land prices in the countries newly admitted to the EU and the ountries belonging to the Old Fifteen.

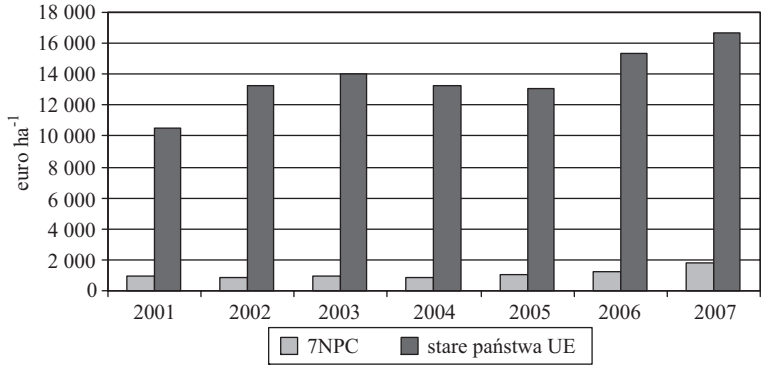

Fig. 1. Average agricultural land selling prices

Source: prepared on the basis of the data from Eurostat and *Sprowozdanie*... 2008, p. 9.

On the other hand, the formation of the land rent for agricultural land in particular countries is presented in Table 4. At the end of this research, the price of land usufruct lease was the lowest in Slovakia and amounted to 18 EUR in 2006. In the Czech Republic, Lithuania and Poland the prices were 32 EUR, 33 EUR and 41 EUR per hectare (2007). The highest usufruct lease price was 67 EUR/ha in Hungary in 2007.

Table 4

Agricultural land rent in 7 NMS and in old EU countries in euro per hectare

Description	Years							Average
	2001	2002	2003	2004	2005	2006	2007	
The Czech Republic	15	20	24	24	27	32	32	25
Estonia	–	–	–	–	–	–	–	–
Latvia	–	–	–	–	–	–	–	–
Lithuania	9	12	13	14	17	22	33	17
Hungary	–	41	45	53	57	63	67	54
Poland	29	26	25	26	43	35	41	32
Slovakia	–	7	9	10	14	18	–	12
Average	18	21	23	25	32	34	43	
Denmark	328	346	368	391	399	397	456	384
Germany	–	164	–	174	–	176	–	171
France	124	123	124	123	122	–	–	123
Holland	405	443	445	445	447	462	466	445
Sweden	107	104	108	110	110	108	110	108
Average	241	236	261	249	270	286	344	

Source: prepared by the author on the basis of the data from Eurostat 2001–2008 and *Sprawozdanie*... 2008, pp. 9–10.

It is noteworthy that usufruct lease is a common form of agricultural land use in the "old" EU countries. Figure 2 presents average prices of agricultural land usufruct lease. During the period of investigation, a systematic but small increase in the land lease rent was recorded in the countries newly admitted to the EU. Like in the case of an average agricultural land selling price, there is a large difference between the land prices in the countries newly admitted to the EU and the countries belonging to the Old Fifteen.

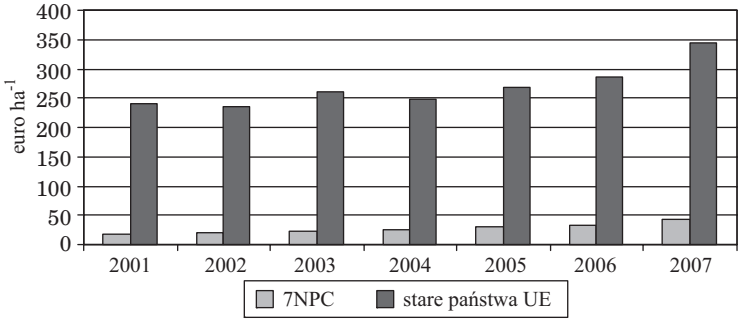

Fig. 2. Average agricultural land lease rent
Source: prepared on the basis of data from Eurostat and *Sprawozdanie*...2008, pp. 9–10.

Conclusion

In 2004, before the accession and just after it, the prices of agricultural land did not change significantly in the 7NMS. It was only in Lithuania in 2003 and in Poland in 2002 that the cost which had to be incurred for agricultural land purchase was higher, which might be connected with the pre-accession processes.

In all newly admitted countries the price of land started to go up from 2005. The highest increase was recorded in Latvia, Hungary and Poland. The entry of these countries into the structures of the EU was conducive to the growth of interest in purchasing land mainly for two reasons:

1) direct farm subsidies,

2) western companies' investments in places of lower prices of the fundamental farm production factor – land.

Average prices of land and lease rent in 7NMS are nearly 10 times lower than in the old fifteen countries. Sweden, where natural conditions are much more difficult and do not favour farm production and the population level is low, is an exception.

Translated by JOLANTA IDŹKOWSKA

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COMPETITION ON THE POSTAL SERVICE MARKET IN POLAND

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K e y w o r d s: competition, services, service market.

A b s t r a c t

Services play an important role in the Polish economy alongside industry, construction, banking or agriculture. On the European Union markets services represent the dominant area of economic activity. This position is exemplified by the number of employees in that sector of the European Union economy providing jobs to about 75% of the total EU professionally active population.

Results of the analysis of source materials concerning the level of competition in the postal market indicate its rapid development, including fierce competition in the sector of services allowed for every operator after obtaining the concession as well as completely deregulated postal services. In the reserved services market only the monopoly of the Polish Post Office continues in providing services of general nature.

KONKURENCJA NA RYNKU USŁUG POCZTOWYCH W POLSCE

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S ł o w a k l u c z o w e: konkurencja, usługi, rynek usług.

A b s t r a k t

W polskiej gospodarce, obok przemysłu, budownictwa, bankowości i rolnictwa, usługi odgrywają ważną rolę. Na rynkach państw Unii Europejskiej stanowią dominujący obszar działalności gospodarczej. Przykładem tej pozycji jest liczba zatrudnionych w tym sektorze gospodarki Unii Europejskiej – ok. 75% ogółu czynnych zawodowo mieszkańców UE.

Wyniki przeprowadzonej analizy źródeł dotyczących poziomu konkurencji na rynku usług pocztowych wskazują na jego szybki rozwój, a tym samym na silną konkurencję w sektorze usług dozwolonych każdemu operatorowi po uzyskaniu koncesji oraz w usługach pocztowych całkowicie wolnych. Jedynie na rynku usług zastrzeżonych trwa monopol Poczty Polskiej na świadczenie usług o charakterze powszechnym.

Introduction

With the systemic transformations that took place in Poland after 1989 the phenomenon of competition started functioning. A single operator, the Polish Post, monopolized the market of postal services until that time. During the period of transformation, foreign entities started appearing in the market providing services in that field. We can conclude that their activities were highly efficient as in the market of courier services they have taken over around 97% of the total volume of such services.

Subject structure of the postal services market

Postal services market is divided into the:

– reserved services market – postal provided in that market are services on the base of appropriate concessions. Entities operating in that market are operators functioning on the base of the concession or registration with the register, among which the Poczta Polska S.A. [Polish Post S.A.] plays the major role;

– market of postal services open to every operator after obtaining the concession from the Office of Electronic Communications (UKE);

– market of postal services open for every entity.

The postal services market is rather diversified. Although two types of business entities are involved in providing the services:

1. the public operator – in case of postal services Poczta Polska S.A.

2. other postal operators, mainly private ones, providing services in the strictly defined segment of postal services market encompassing courier services, not addressed prints and mail of private business entities. Such operators operate on the base of the concession obtained.

Competition in the postal services market

The market of postal services in Poland is one of a few markets developing dynamically as concerns establishment of competition. During the initial years of the free market economy operation in Poland the competition was quite weak.

On the base of this graph it can be noticed that during the years 1996–2009 the number of non-public operators increased almost 14-fold (from 15 to 209). The dynamic increase in the number of operators emerging in the here-discussed market has been observed as of 2001. The largest year-to-year

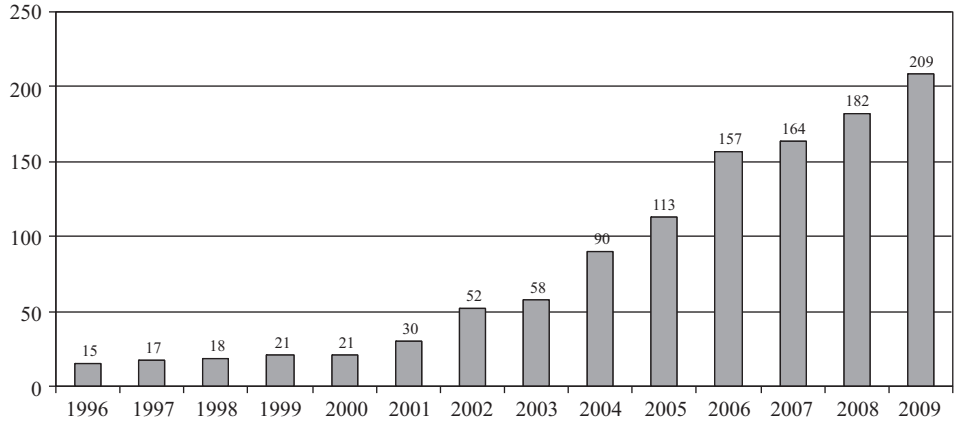

Fig. 1. Number of non-public operators during the the years 1996–2009
(as at December 31 of each year)
Source: own work based on the: *Raport Prezesa Urzedu Komunikacji Elektronicznej...* 2010.

increase was recorded in 2002 (+ 73%) and 2004 (+ 55%). The UKE data indicate that in 2008 the number increased by another 18 operators of postal services and reached 182. In 2009 then the number reached 209 registered entities.

Analyzing, however, the capital of non-public operators operating in 2008 engaged in establishment of those businesses we can conclude that it was at a relatively low level amounting:

– up to PLN 10.000 – 18 non-public operators,
– from PLN 10.000 up to PLN 50.000 – 23,
– from PLN 50.000 up to PLN 100.000 – 6,
– from PLN 100.000 up to PLN 500.000 – 10,
– from PLN 500.000 up to PLN 1 million – 2,
– from PLN 1 million up to PLN 10 million – 5,
– from PLN 10 million up to PLN 50 million – 3,
– over PLN 50 million – 1,
– no data available – 38 (*Raport Prezesa Urzędu Komunikacji Elektronicznej...* 2009, p. 18).

Analyzing the coverage by operations of non-public operators, we can find out that:

– 51 operators operate locally, including:
  a) 22 in the area of a voivodship,
  b) 10 in the area of a county,
  c) 16 within a city,
  d) 3 within other area of local character;

– 24 operators operate on national scale;
– 22 operators operate on the national and international scale,
– 9 operators operate in the international market only.

Despite such major development in the postal services market the quality of services provided by individual operators is not fully satisfactory. Only the time deliveries are made within appropriate time.

Table 1

National timeliness indicators in 2007 for priority mail

Time of delivery	National timeliness indicators 2007	Target in delivery timeliness (quality standard)
	in %	
D + 1	77.21	82
D + 2	95.57	90
D + 3	98.49	94

Source: own work based on the: *Raport Prezesa Urzędu Komunikacji Elektronicznej*... 2008.

According to Annex No. 2 to the Regulation by the Minister of Infrastructure on conditions of providing general postal services, the national timeliness indicator in 2008 for priority mail (D+1, meaning delivery of mail on the next working day after the date of mailing) in case of the majority of the relations does not satisfy the requirements defined and the effective European standards.

Table 2

National timeliness indicators in 2007 for economy mail

Time of delivery	National timeliness indicators 2007	Target in delivery timeliness (quality standard)
	in %	
D + 3	80.57	85
D + 5	96.70	97

Source: own work based on the: *Raport Prezesa Urzędu Komunikacji Elektronicznej*... 2008.

According to Annex No. 2 to the Regulation by the Minister of Infrastructure on conditions of providing general postal services, the national timeliness indicator in 2007 for economy mail does not satisfy either the requirement of D+3, or even D+5.

Table 3

National timeliness indicator for delivery of priority packages computed on the base of aggregated data

Time of delivery	National timeliness indicators 2007	Target in delivery timeliness (quality standard)
	in %	
D + 1	57.80	80

Source: own work based on the: *Raport Prezesa Urzędu Komunikacji Elektronicznej*... 2009.

The national timeliness indicator for delivery of priority packages looks similar to hat for economy packages with the exception of packages sent in the relation rural area – city for the distance of up to 200 km, for which that indicator was 91.6%. The lowest timeliness indicator occurred in case of economy packages sent in the same relation, i.e. rural area – city for the distance exceeding 200 km and it was 72.6%.

Table 4

National timeliness indicator for delivery of economy packages computed on the base of aggregated data:

Time of delivery	National timeliness indicators 2007	Target in delivery timeliness (quality standard)
	in %	
D + 3	84.30	90

Source: own work based on the: *Raport Prezesa Urzędu Komunikacji Elektronicznej*... 2009.

The national timeliness indicator for delivery of economy packages satisfies the requirements of D+3.

Adjustment of facilities to the needs of the clients, in particular the disabled ones, represents a significant problem for postal operators. This applies to both non-public operators and the public operator.

Analyzing the results of control conducted during the years 2003–2007, it can be noticed that as of 2004 the values of some indicators improved (e.g. publication of information, access to mail boxes, marking of windows, receipt of mail).

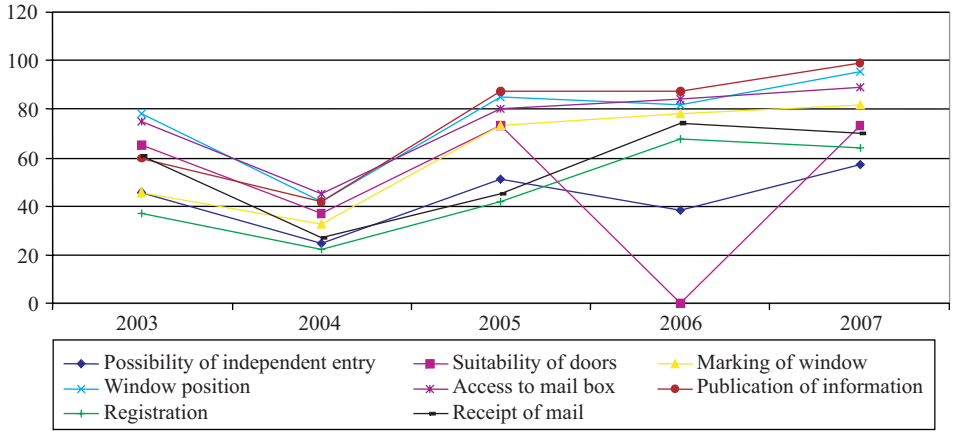

Fig. 2. Comparison of the results of control in towns conducted during the years 2003–2007 (in %)
Source: own work based on the: Office of Electronic Communications. Evaluation of postal facilities adjustment to provide services for the disabled in 2008.

Conclusion

Competition in the postal services market is developing relatively dynamically. Despite large potential in possession of Poczta Polska S.A. in the form of the network of post offices, logistics, Forwarding-Distribution Centers, the competing operators are beginning taking over some of its services, which in particular applies to the courier services provided by operators such as the DHL, DGD, TNT, UPS or InPost.

The competition will surely increase with further liberalization of that market, which, as well know, provides that as of 2013 the market will be more open for non-public operators. Then postal operators from other European Union countries will join the combat for the postal services market in Poland. It must be concluded that the public operator, i.e. Poczta Polska S.A. is conducting activities towards weakening its current position, which is confirmed by, e.g. the financial results of that company for the past 5 years.

Assuming further liberalization of the market, which is to take place as of the beginning of 2013, the thesis can be formulated that competition between individual operators operating in that market will increase. Increasing opening of the market to non-public operators of the discussed services might contribute to activation of entities domiciled in the other European Union countries.

Translated by Jerzy Gozdek

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GUIDELINES FOR TEXT PREPARATION FOR THE "OLSZTYN ECONOMIC JOURNAL"

ZASADY PRZYGOTOWANIA ARTYKUŁU DO "OLSZTYN ECONOMIC JOURNAL"

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Underneath the paper title (in Polish and English), followed by the name and surname of the author (authors), name of the organizational unit (institute, faculty, chair, division) and the school should be provided.

The key words (maximum 5 words) and abstract in Polish should also be provided. The paper together with the abstract may not exceed 12 pages of the text. The abstract of up to 0.5 page should present the objective, subject, methodology and results of the research/study.

Each paper should consist of the identified following parts:

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– interpretation of the results obtained, discussed in the individual parts of the paper,
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The units of measurement should be given according to the international SI system. Tables and figures (photographs and graphs) should be numbered with Arabic numbers and provided with the title and source. Mathematic formulas should be written in the WORD editor. Letters of the Greek alphabet, symbols, special signs should be clearly explained in the margin with indication which of them are to be set in ordinary, italics or bold set.

Graphic materials (drawings, diagrams, graphs) should be prepared in the software operating in the Windows environment (e.g. Excel, Corel Draw). Figures prepared in other specialist software should be recorded in the Windows Metafile (*.wmf) format allowing importing them to Corel. In the text references to the figures and tables should be made in the sequence from 1 to n (according to the numbering).

Under the tables and figures their source should be given.

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The literature should be quoted in the paper by providing the author's name, year and pages in brackets (e.g. KOWALSKI 1999, p. 23, KOWALSKI, NOWAK 2000, pp. 5–8, WIŚNIEWSKI et al. 2003, pp. 34–56) or according to WIŚNIEWSKI (2000, pp. 11–12).

If the reference in the text concerns a collective paper, instead of the author;s name the full title of the paper (Elektronika. 1993) or the abbreviated title (Dbajmy o właściwe suszarnictwo... 1992) should be given.

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KOS C. 1997. *Marketing produktów żywnościowych*. PWRiL, Warszawa.

Collective papers:

Dbajmy o właściwe suszarnictwo ziarna. Red. K. LEWIN 1982. T. 1. PWN, Warszawa.

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LENARTOWICZ M. 1963. Opis bibliograficzny. W: Metodyka bibliograficzna. SBP, Warszawa, s. 6–16.

Periodicals:

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Unpublished papers:

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